WHITE PINE BLISTER RUST CONTROL

IN THE

NORTHWESTERN REGION

January 1 to December 31, 1943

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine
Division of Plant Disease Control
Blister Rust Control
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Spokane, Washington

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Introduction

Blister rust control work in the Northwestern Region is conducted under the general leadership and technical direction of the Bureau of Entomology and Plant Quarantine cooperating with the U. S. Forest Service, the National Park Service and state and private agencies. This section of the report dealing with the general blister rust situation in the Northwestern Region is followed by brief summaries of the work on:

1. State and private lands
2. National Forests
3. National Parks

In addition to these summaries, detailed operation reports covering individual territorial units are presented.

1943 Season

Progress. During 1943, a total of 36,747 acres were worked including 8,927 acres of initial work and 27,820 acres of reeradication. This is not an impressive accomplishment in view of the amount of work which needs to be done, but under the handicaps of the war emergency, the working of a township and a half of high priority white pine land and assuring its retention in white pine production is significant.

Labor. With the exception of 87 Italian internees and 26 Civilian Public Service workers, the only source of labor for blister rust control was from high school students. A large number of these 16 and 17 year old boys were secured from all sections of the country, the majority coming from the Northwest. At the peak of the season, approximately 1,530 boys were employed. A nucleus of experienced workers was lacking since eighteen years had constituted the minimum age for blister rust workers in previous years making all former seasonal workers subject to Selective Service. This situation made the problem of training and supervision more difficult. The effectiveness of the younger boys did not measure up to a normal crew and yet as the season progressed they shaped up to reasonably satisfactory units as evidenced by the weekly improvement in production and efficiency. By August they compared favorably with a standard crew. Unfortunately an exceptionally stormy month of June together with the early starting of school in the fall resulted in such a short season that the benefits of the training and accumulated experience of the boys were not fully utilized. Under the circumstances, these youthful workers are paying their way and even though they do not measure up to a standard crew, the work which they are performing now will accomplish more in the protection of white pine than if postponed to some future time.

Also this work is serving to protect and maintain white pine on high priority sites which otherwise would be lost due to the rapid build-up of pine infection.

The labor outlook for 1944 is much the same as in 1943 with the 16 and 17 year old boys representing the main source. The crews will be more efficient as most of the 16 year old and some of the 17 year old boys employed in 1943 will be back. This nucleus of trained and experienced workers represents a great improvement over conditions which existed at the start of the 1943 season when there were very few experienced workers available. There is some indication also that a few older boys or men may be available which will generally strengthen the crews.

Supervision and Checking. Experienced and capable camp superintendents were available for most camps. Deficiencies were met by preseason training of high school teachers and other qualified candidates. Very few checkers were available and those employees who were qualified were more urgently needed for direct supervision of the crew work. As a result, the regular check was only applied to the areas where there was an important need for such an inspection. On the other areas, a post check inside of about two years will be satisfactory. Efficiency of the crews was maintained by employment of the "gang formation" with the crew leader checking directly behind the crew. This made possible the close supervision of all crews by the camp superintendent and also enabled him to make daily checks on the efficiency of all crew work.

Infection Conditions. With blister rust heavily entrenched in the Inland Empire white pine type, the amount of pine infection is increasing from year to year. In 1943, the pine infection occurring in 1941 appeared. The great amount of this infection particularly on areas where infection was established in 1937 and on which ribes eradication had not been performed in the interim marks 1941 as being a most favorable year for spread of the rust from ribes to pine, equalling in intensity the heavy wave which occurred in 1937. The year 1937 was characterized not only by heavy spread of infection from ribes to pine but also by the generally heavy and long distance spread from pine to ribes which introduced blister rust into many new areas. In 1941, the spread from ribes to pine was equally or more severe but weather conditions in the spring of 1941 were not such as to permit the long distance spread from pine to ribes. This means that the serious infection build-up in 1941 occurred where there was close association of ribes to fruiting blister rust cankers.

Only a normal increase in pine infection is expected to have occurred in 1943. Field observations indicate that much of the ribes infection dissipated itself during the summer and except in localized areas where conditions were most favorable, the amount of telia developing on ribes was not great.

More information on infection conditions is to be found in the "Disease Investigations" report and in the reports for those operation which performed disease surveys in 1943.

Review of Progress and Results from 1924-1943

The total work accomplishment in Idaho, Montana, and Washington to date is: 1,899,601 acres first working, 406,388 acres second working and 71,792 acres third working, making a total acreage of 2,377,781 reported initially worked and reworked. This required 2,044,554 effective man-days and 433,478,467 ribes were destroyed. Some 799,300 acres of worked area are reported as on maintenance with an additional 205,000 acres of mature stands placed in a deferred working status as not requiring ribes eradication before the areas are logged.

To a certain extent the above data indicate the accomplishments in protection of white pine from blister rust by showing the large amount of work which has been performed in the eradication of ribes, but these figures do not show satisfactorily what the real accomplishments have been and wherein the control program has not kept apace with the spread and intensification of blister rust. A complete presentation of the blister rust situation in the Northwestern Region will be possible upon the completion of the area classification survey initiated in the fall of 1943. At this time it is possible to review in general terms the present status of the entire problem.

Fundamentally, the problem of protecting white pine in this region divides itself into two phases: (1) the protection of established white pine stands, and (2) the protection of new stands of white pine coming in following logging or fires. This distinction is transitory because with the passage of time, new stands become well established and additional stands are originating annually on newly denuded areas. In discussing the present blister rust situation, it is convenient to consider the status in white pine stands 20 years old and older and in the new stands 0 to 20 years old. This division is significant because two important events occurred in this region 21 years ago in 1923; the first ribes eradication project was inaugurated and, as later determined, the first centers of blister rust on white pine originated in 1923.

It is important to realize what has happened in the forest itself during these 21 years. During this period, tree growth has changed the then existing small white pine seedlings to advanced reproduction, reproduction into pole size and pole size into young mature. (See illustration.) To a great extent the problem of ribes eradication and the difficulty of establishing control vary indirectly with the age of the stand. Those who have struggled with the blister rust problem in these areas of varying age class have realized the changed conditions since ribes eradication was performed but the casual observer in the woods is inclined to view the more advanced age classes as they are now without realizing what they were like when the ribes were eradicated.

With these changing conditions in mind, one can better appreciate the fact that practically all stands 20 years old and older are now in good condition, either under permanent control or sufficiently well protected that another working or mop-up will complete the job. This reference does not include those outlying areas which are being dropped from the control area because blister rust damage had gone too far, and also a small amount of acreage dropped where initial eradication under the large CCC and WPA programs was

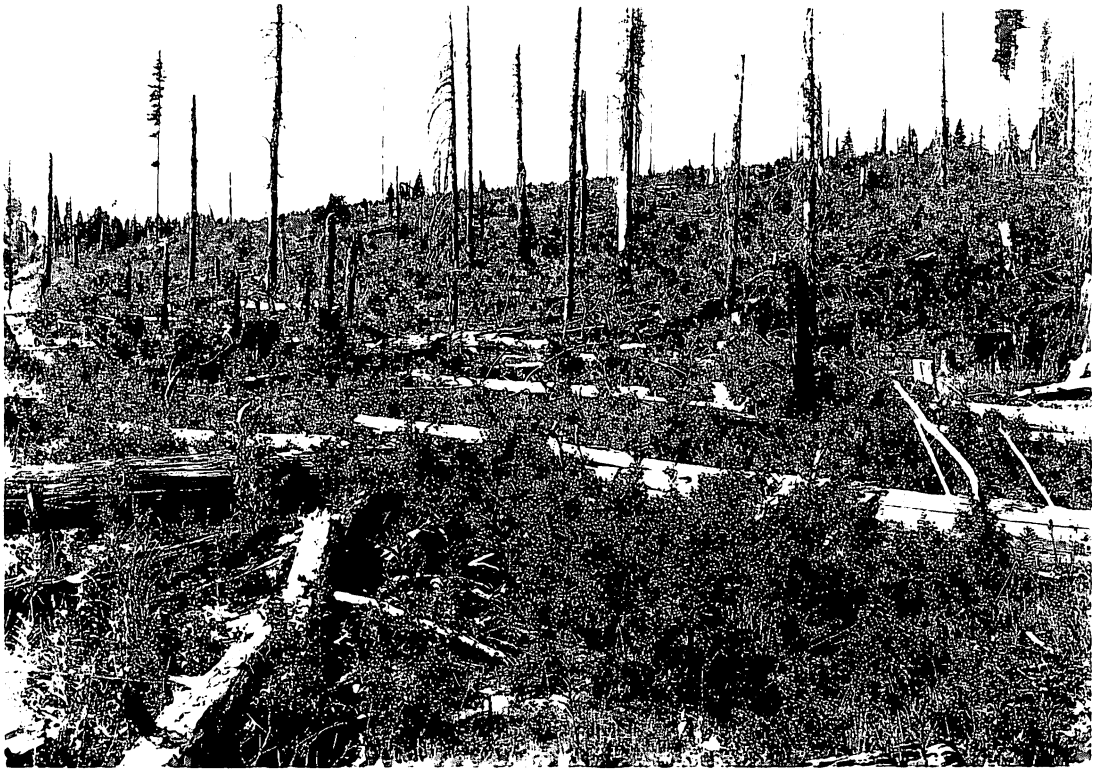
performed too late or facilities were not available for following through in sufficient time with necessary reeradication. These areas will stand as mute evidence of damage which might have occurred without ribes eradication throughout all the white pine type in all age classes.

If the white pine forests had remained undisturbed since 1923 when blister rust control work was started, the job of protection would have been completed. Such a supposition is farfetched because the changing aspect of the forests resulting from either logging or fire is inevitable. Nevertheless had the early planned programs of control been put into operation the white pine areas could have been entirely protected before blister rust became heavily entrenched and ahead of any great accumulation of cutover area coming back to white pine. Had this been the case, the job of control would have been less costly and the problem now would only be the relatively small one of protecting the new crop of white pine coming in after logging upon an average of 15,000 to 25,000 acres annually.

This was not the case and consequently over this 21 year period there has been a considerable acreage of new young white pine stands following logging and in some localities following fires occurring in the late twenties and early thirties. The heavy demand for white pine lumber for war purposes has added greatly to these cutover areas in the last three years. The problem of control on these lands is exceedingly difficult since ribes and pine come back together on these newly disturbed areas.

As compared to the very favorable protection conditions in stands over 20 years old, the situation in the 0-20 year age class is serious and complex. This young age class is taking an ever increasing proportion of the control effort and now is requiring most of the work. It is difficult to generalize on the protection status in these areas since this age class represents the critical stage and in most cases requires three workings spaced through the period to establish control. Progress in this direction varies from no workings in the more recent cuttings to one and in some cases two or three workings in the 15-20 year class. The degree of protection will vary accordingly with those stands at the top of the age class which have received the necessary workings being in good condition. The progress of control in these young stands is far behind schedule particularly due to the inadequacy of the control program during the last four or five years. The seriousness of this situation must be emphasized because the long term management and perpetuation of white pine depend upon the protection of these young stands, and also the elimination of the necessity for ribes eradication on the next stand rotation is dependent upon the removal of the present ribes crop before a substantial volume of seed is dropped.

In all cases it is not feasible or practical to attempt blister rust control on cutover areas. On areas where hundreds or thousands of ribes per acre come in immediately following logging and spread infection to a high percentage of the pine seedlings as soon as they appear, the high costs of ribes eradication are out of proportion to the possibilities of saving sufficient pine. There are also those areas which brush will take over if the first crop of white pine seedlings is lost. Such areas, if they represent a high quality white pine site are placed in a deferred classification. If the agency owning



W-913. Logged in 1915, burned over in 1917. Picture taken in 1931. Ribes eradicated in 1933 and 1941.

W-913-11. Same area in 1942 protected from blister rust - with 500 to 1,000 white pine per acre.

this land desires to grow white pine on it, one solution is a controlled broadcast burn followed by planting. A clean burn will reduce the ribes to practically nothing. Recent developments along the lines of direct seeding of white pine indicate that planting may be greatly simplified and be performed at a fraction of the present cost.

On the other hand, there are some favorable factors which make possible the protection of white pine and its perpetuation on cutover areas. There is considerable acreage on which the number of white pine seedlings is so great that losses from blister rust due to the long intervals between ribes eradication work are not causing damage to the stocking in the stand. Another condition which is not uncommon, is the long period over which white pine continues to come in on areas after logging or fire. This is evidenced by the results of disease surveys and field inspections which show new white pine germinating after 15 and 20 years. This is important where it has not been possible to follow through with control work on schedule because many areas examined show more new pine coming in than have become infected with the rust.

Area Classification

The above discussion would be more informative if supported by acreage figures applying to the various problems. Such information is now being assembled from the results of an area classification survey made in the fall of 1943 by the permanent staff of the Spokane Blister Rust Control Office assisted by personnel of the U. S. Forest Service.

Although work areas had been carefully selected in the year to year planning, a re-evaluation of the entire white pine control area was needed particularly since the control program was falling behind necessitating some retrenchment, establishing working priorities, and focusing of control efforts on the more valuable white pine area. A set of area classifications based upon the pine producing qualities of an area and the feasibility of establishing protection from blister rust was developed. In making these classifications, the suitability of the area in the long term management for white pine was given consideration. At this writing it is possible to state that there will be a considerable reduction in the size of the control area primarily from the change of site characteristics caused by logging or the existence of a heavy residual stand of other species after the removal of the mature white pine. The status of the latter areas will depend upon the future utilization of these other tree species and the subsequent management of the lands. Thus far, the acreage lost due to blister rust has not been large, but the loss has been serious. Most of the acreage in this category which is being dropped is the additions made to the control area in 1938 on which no ribes eradication work has ever been performed.

Area Classes

Class. Designation applied to an area based on its white pine producing value or its relation to the blister rust control work program. The classes fall into three categories, work areas (highest priority in protection, classes 1, 2), deferred areas (classes 3, 3A, 4, 5, 5A, 5AA), dropped areas (classes 3B, 4A, 5B, 6).

Class 1. Areas predominately well stocked with thrifty white pine of reproduction or pole size which can be protected at a reasonable cost. Class 1 areas are expected to produce a white pine volume of 20,000 bd. ft. or more per acre. Individual appraisal in which the various factors or combination of factors are considered must be relied upon in making area classifications. As a general guide for stands of normal composition and even distribution of species, the following stocking of dominant and codominant white pine at various ages may be expected to yield 20,000 bd. ft. per acre at maturity.

Age or diameter	White pine trees per acre
0-10 yrs.	400
30 yrs. (4" d.b.h.)	120
50 yrs. (8" d.b.h.)	90
80 yrs. (12" d.b.h.)	70

Class 2. Areas sufficiently stocked with thrifty white pine of reproduction or pole size which warrant the cost of protection. Class 2 areas are expected to produce between 10,000 bd. ft. and 20,000 bd. ft. per acre and would be included in all work programs. This class of area would not measure up to class 1 in pine stocking, site, cost of protection, and feasibility of control. As in the case of class 1, individual appraisal must be relied upon. As a general guide, the following stocking of dominant and codominant white pine at various ages may be used to represent requirements necessary to produce 10,000 bd. ft. per acre at maturity.

Age or diameter	White pine trees per acre
0-10 yrs.	200
30 yrs. (4" d.b.h.)	70
50 yrs. (8" d.b.h.)	40
80 yrs. (12" d.b.h.)	30

Class 3. Potential white pine areas not supporting adequate stocking or an adequate source of seed. Under present conditions, areas would not warrant blister rust control but because of the possibilities of their becoming good white pine areas through planting or natural seeding they are held in a deferred status.

Class 3A. Areas of reproduction or pole not supporting sufficient white pine to meet class 1 and 2 standards. Class 3A is to take care of stands with light stocking of white pine on which the growth of other species has eliminated further establishment of white pine through planting or natural seeding. Class 3A would be retained in the control area if it is already on maintenance or a low cost ribes eradication job is commensurate with the pine values present.

Class 3B. Understocked white pine stands which do not warrant cost of protection and should be dropped from the control area.

Class 4. Areas comparable to classes 1 and 2, except that the cost of control work and the heavy pine infection make it inadvisable to attempt control under the present program.

Class 4A. Class 4 areas dropped from control area.

Class 5. Areas of mature or pole size white pine on which working is deferred.

Class 5A. Cutover areas supporting heavy residual stand of trees other than white pine on which control work is deferred awaiting further cutting or disposal before being reclassified.

Class 5AA. White pine cutover areas with little or no residual stand or white pine seed trees which have definite possibilities of reproducing to white pine and have a high priority in long term white pine management. This class of area may be worked when necessary to save first crop white pine seedlings.

Class 5B. White pine cutover areas which will not come back to white pine and are dropped from the control area.

Class 6. Non-white pine type and areas of poor site, high elevation, rocky, etc., which should be dropped from the control area.

Conclusion

The blister rust control problem in the Northwestern Region is serious because of the primary position which white pine occupies in the timber industry of the Inland Empire and the economic dependency of the region on this industry. The successful prosecution of a control program for the protection of white pine is dependent on a stabilized annual project which will permit the carrying through to completion any work that is started.

A field force of approximately 3,500 to 4,000 men working an average of four months during the field season for a period of five years is necessary to gain permanent protection in the white pine stands in the present control area of Idaho, Montana and Washington. After existing stands are placed on a maintenance basis, the future control job will revert to a small scale project of protecting a few thousand acres of cutover land which is logged annually and performing maintenance work in stream type.

TABLE 1

PROGRESS OF RIBES ERADICATION IN THE NORTHWESTERN REGION IN 1943

State	Ownership	Acres Worked			
		First	Second	Third	Total
Idaho	National Forests	4,035	7,282	3,487	14,804
	Public Domain	160	270	837	1,267
	State	120	2,013	1,024	3,157
	Private	1,299	4,406	3,157	8,862
	Total	5,614	13,971	8,505	28,090
Montana	National Forests	2,487	531	389	3,407
	National Parks	302	86		388
	Private	256	171		427
	Total	3,045	788	389	4,222
Washington	National Forests	268	2,623	1,119	4,010
	National Parks			425	425
	Total	268	2,623	1,544	4,435
Total	National Forests	6,790	10,436	4,995	22,221
	National Parks	302	86	425	813
	Public Domain	160	270	837	1,267
	State	120	2,013	1,024	3,157
	Private	1,555	4,577	3,157	9,289
	Total	8,927	17,382	10,438	36,747

TABLE 2

RIBES ERADICATION IN THE NORTHWESTERN REGION, 1923-1943

State	Ownership	Acres Worked				Acres Unworked	Acres Deferred	Total White Pine Area
		First	Second	Third	Total			
Idaho	Nat. Forest	871,361	203,626	27,135	1,102,122	202,275	56,454	1,130,090
	Pub. Domain	16,642	5,840	1,039	23,521	13,908	1,040	31,590
	State	264,138	50,110	8,892	323,140	48,782	32,030	344,950
	Private	490,994	103,007	20,306	614,307	215,004	95,027	801,025
	Total	1,643,135	362,583	57,372	2,063,090	479,969	184,551	2,307,655
Montana	Nat. Forest	108,715	7,944	2,244	118,903	37,700	17,468	163,883
	Nat. Parks	3,197	817		4,014	6,803		10,000
	Pub. Domain	40			40			40
	State	734	1		735	234		968
	Private	18,993	2,056	1,374	22,423	14,366	2,490	35,849
	Total	131,679	10,818	3,618	146,115	59,103	19,958	210,740
Washington	Nat. Forest	69,708	16,371	1,752	87,831	29,602		99,310
	Nat. Parks	8,254	5,028	4,369	17,651			8,254
	Pub. Domain	315	60		375			315
	State	6,832	3,935	2,114	12,881	3,018		9,850
	Private	39,678	7,593	2,567	49,838	11,942		51,620
	Total	124,787	32,987	10,802	168,576	44,562		169,349
Subtotal	Nat. Forest	1,049,784	227,941	31,131	1,308,856	269,577	73,922	1,393,283
	Nat. Parks	11,451	5,845	4,369	21,665	6,803		18,254
	Pub. Domain	16,997	5,900	1,039	23,936	13,908	1,040	31,945
	State	271,704	54,046	11,006	336,756	52,034	32,030	355,768
	Private	549,665	112,656	24,247	686,568	241,312	97,517	888,494
	Total	1,899,601	406,388	71,792	2,377,781	583,634	204,509	2,687,744
Colo-rado	Nat. Forest	14,859	1,962		16,821	184,141		199,000
	Nat. Parks					7,000		7,000
	Total	14,859	1,962		16,821	191,141		206,000
Wyoming	Nat. Forest	21,760			21,760	200,240		222,000
	Nat. Parks					18,700		18,700
	Indian Res.					11,000		11,000
	Total	21,760			21,760	229,940		251,700
Sub-total	Nat. Forest	36,619	1,962		38,581	384,381		421,000
	Nat. Parks					25,700		25,700
	Indian Res.					11,000		11,000
	Total	36,619	1,962		38,581	421,081		457,700
Total North-western Region	Nat. Forest	1,086,403	229,903	31,131	1,347,437	653,958	73,922	1,814,283
	Nat. Parks	11,451	5,845	4,369	21,665	32,503		43,954
	Pub. Domain	16,997	5,900	1,039	23,936	13,908	1,040	31,945
	Indian Res.					11,000		11,000
	State	271,704	54,046	11,006	336,756	52,034	32,030	355,768
	Private	549,665	112,656	24,247	686,568	241,312	97,517	888,494
	Total	1,936,220	408,350	71,792	2,416,362	1,004,715	204,509	3,145,444

Allotments and Expenditures

Federal funds for white pine blister rust control are contained in the Agricultural Appropriation Act and are allotted to the various federal agencies carrying on blister rust control. Additional funds are contributed by state and private agencies to be used with federal funds for work on state and private lands.

	Fiscal Year 1943	Fiscal Year 1944
Federal Allotments:		
Entomology and Plant Quarantine:		
Work Project BLR-1-4	$ 83,500.00	$ 80,000.00
Work Project BLR-3-4	75,195.00	56,088.00
Subtotal	$158,695.00	$136,088.00
Forest Service:		
Financial Project BLR-4	$641,474.00	$550,000.00
National Park Service:		
Financial Project BLR-5	$ 24,190.00	$ 12,755.50
Total Federal Allotments	$824,359.00	$698,843.50
State and Private Funds: (Deposited with U. S. Treasury)		
State of Idaho	$22,106.35	$10,000.00
Clearwater Timber Protective Assn.	6,000.00	6,781.18**
Potlatch Timber Protective Assn.	5,200.34	4,959.06*
Priest Lake Timber Protective Assn.	4,240.44	4,259.42*
Total State and Private Funds	$37,547.13	$25,999.66

* In process of transfer to U. S. Treasury

** $386.68 deposited. Balance in process of transfer to U. S. Treasury

Expenditures - Calendar Year, 1943

	Idaho	Montana	Washington	Total
Entomology and Plant Quarantine:				
Work Project BLR-1-4	$ 72,517.46	$ 8,177.87	$ 5,813.55	$ 86,508.88
Work Project BLR-3-4	102,268.99			102,268.99
Total	$174,786.45	$ 8,177.87	$ 5,813.55	$188,777.87
Forest Service BLR-4:	$355,780.60	$42,200.99	$37,508.34	$435,489.93
National Park Service BLR-5:		$ 1,090.34	$14,937.34	$ 16,027.68
Subtotal Federal Expenditures	$530,567.05	$51,469.20	$58,259.23	$640,295.48
State and Private BLR-3-4:				
State	$ 12,252.13			$ 12,252.13
Private	386.68			386.68
Total	$ 12,638.81			$ 12,638.81
Grand Total	$543,205.86	$51,469.20	$58,259.23	$652,934.29

Expenditures - 1922-1943

Bureau of Entomology and Plant Quarantine: (1922-1943)

State	Regular	ERA(WPA)	NIRA(PWA)	Total
Idaho	$1,513,622.06	$3,002,140.71	$ 470,841.62	$4,986,604.39
Montana	219,749.87	196,847.11	88,306.79	504,903.77
Washington	232,584.51	459,112.87	105,199.60	796,896.98
Subtotal	$1,965,956.44	$3,658,100.69	$ 664,348.01	$6,288,405.14
Colorado	11,852.04	59,396.51	8,041.45	79,290.00
Wyoming	11,314.28	58,283.96	7,107.41	76,705.65
Subtotal	$ 23,166.32	$ 117,680.47	$ 15,148.86	$ 155,995.65
Grand Total	$1,989,122.76	$3,775,781.16	$ 679,496.87	$6,444,400.79

Forest Service: (1930-1943)

State	Regular	ERA(WPA)	NIRA(PWA)	Total
Idaho	$3,277,459.60	$ 421,155.19	$1,369,184.16	$5,067,798.95
Montana	257,011.64	136,851.46	149,858.06	543,721.16
Washington	210,067.76		134,320.68	344,388.44
Total	$3,744,539.00	$ 558,006.65	$1,653,362.90	$5,955,908.55

National Park Service: (1930-1942)

State	Regular	Total
Montana	$ 9,845.76	$ 9,845.76
Washington	54,392.07	54,392.07
Total	$64,237.83	$64,237.83

State and Private: (1928-1943)

State	State	Private	Total
Idaho	$174,705.04	$119,967.49	$294,672.53*

*Funds deposited with U. S. Treasury and expended by the Bureau of Entomology and Plant Quarantine

Omnibus Tables

Complete summaries of blister rust control work are presented in the following tables. CCC work is valued at $1.50 per man-day on control work. Values are also placed on contributed service by state and private agencies and are listed as "indirect aid," while "direct aid" refers to funds deposited with the U. S. Treasury together with a small amount of direct service on the ribes eradication program performed by the state of Idaho.

TABLE 1

SUMMARY OF 1943 RIBES ERADICATION

State	Initial Eradication Work			Reeradication Work			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	5,614	1,075,212	9,173	22,476	1,697,881	28,376	28,090	2,773,093	37,549
Montana	3,045	400,428	3,130	1,177	77,584	1,560	4,222	478,012	4,690
Washington	268	164,216	539	4,167	375,207	4,320	4,435	539,423	4,859
Total	8,927	1,639,856	12,842	27,820	2,150,672	34,256	36,747	3,790,528	47,098

State	Ribes Per Acre		Man-Days Per Acre		Number of Camps			Number of Employees				
								Laborers			All	Total
	Initial Eradication	Reeradication	Initial Eradication	Reeradication	C.P.S.	Reg.	Total	C.P.S.	Reg.	Total	Supervision	Employees
Idaho	192	76	1.63	1.26		29	29		1,374	1,374	44	1,418
Montana	132	66	1.03	1.33	1	3	4	26	139	165	5	170
Washington	613	90	2.01	1.04		3	3		105	105	5	110
Total	184	77	1.44	1.23	1	35	36	26	1,618	1,644	54	1,698

TABLE 2

SUMMARY OF 1943 RIBES ERADICATION - BY PROGRAMS
(Including all work - initial and reeradication)

State	Regular and Cooperative			C.P.S.		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	28,090	2,773,093	37,549			
Montana	3,834	339,367	3,719	388	138,645	971
Washington	4,435	539,423	4,859			
Total	36,359	3,651,883	46,127	388	138,645	971

TABLE 3

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1943

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
National Forests R-1	6,790	1,297,162	10,468	15,431	987,916	18,335	22,221	2,285,078	28,803
Other Public Domain	160	11,700	157	1,107	63,150	1,708	1,267	74,950	1,865
National Parks	302	103,559	771	511	86,124	1,570	813	189,693	2,341
Subtotal Federal	7,252	1,412,421	11,396	17,049	1,137,190	21,613	24,301	2,549,611	33,009
State and Private	1,675	227,435	1,446	10,771	1,013,482	12,643	12,446	1,240,917	14,089
Grand Total	8,927	1,639,856	12,842	27,820	2,150,672	34,256	36,747	3,790,528	47,098
NATIONAL PARKS									
Mt. Rainier				425	51,038	1,370	425	51,038	1,370
Glacier	302	103,559	771	86	35,086	200	388	138,645	971
Total	302	103,559	771	511	86,124	1,570	813	189,693	2,341
STATE AND PRIVATE LANDS									
Idaho	1,419	199,566	1,227	10,600	1,004,308	12,345	12,019	1,203,874	13,572
Montana	256	27,869	219	171	9,174	298	427	37,043	517
Total	1,675	227,435	1,446	10,771	1,013,482	12,643	12,446	1,240,917	14,089
NATIONAL FORESTS									
Clearwater	1,295	646,943	3,949	376	54,651	993	1,671	701,594	4,942
St. Joe				4,413	234,850	6,342	4,413	234,850	6,342
Coeur d'Alene	1,220	126,719	2,456	2,348	167,491	3,496	3,568	294,210	5,952
Kaniksu	1,738	254,500	1,923	7,374	497,600	6,442	9,162	752,100	8,365
Cabinet	2,487	269,000	2,140	920	33,324	1,062	3,407	302,324	3,202
Total	6,790	1,297,162	10,468	15,431	987,916	18,335	22,221	2,285,078	28,803

TABLE 4

SUMMARY OF ALL OTHER CONTROL WORK FOR 1943

State	Mapping Control Areas		Treatment of Infected White Pines			
	Number Acres Mapped (W.P. & Prot. Zones)	Number 8-Hour Man-Days	Total Number Pines Examined	Number Infected Pines Cut Down	Number Infected Pines From Which Cankers Removed	Number 8-Hour Man-Days
Idaho	373,290	959	117,725	9,418	47,090	277
Montana	96,500	120	2,150	175	950	48
Washington	20,600	83	110,220	8,209	44,121	390
Total	490,390	1,162	230,095	17,802	92,161	715

TABLE 5

SUMMARY OF EXPENDITURES FOR 1943

State	Total			Recapitulation of Federal Funds				
				Regular Funds				
				Bureau of Entomology and Plant Quarantine				
	Federal (All Agencies)	State (Including All Coop. Funds)	Grand Total	Leadership & Coord. (3101)	Lea Act (3103)	Forest Service	National Parks	Total Regular Funds
Idaho	$530,567.05	$14,088.81	$544,655.86	$72,517.46	$102,268.99	$355,780.60		$530,567.05
Montana	51,469.20	2,500.00	53,969.20	8,177.87		42,200.99	$ 1,090.34	51,469.20
Washington	58,259.23	1,000.00	59,259.23	5,813.55		37,508.34	14,937.34	58,259.23
Total	$640,295.48	$17,588.81	$657,884.29	$86,508.88	$102,268.99	$435,489.93	$16,027.68	$640,295.48

State	Financial Projects							
	BLR-1 - Leadership, Coordination and Technical Direction			BLR-3 - Cooperative Blister Rust Control on State and Privately-Owned Lands			BLR-4 Forest Service	BLR-5 National Parks
	Indirect Aid State*	Federal Regular	Total	Direct Aid State*	Federal Regular	Total		
Idaho	$ 450.00	$72,517.46	$72,967.46	$13,638.81	$102,268.99	$115,907.80	$355,780.60	
Montana	2,500.00	8,177.87	10,677.87				42,200.99	$ 1,090.34
Washington	1,000.00	5,813.55	6,813.55				37,508.34	14,937.34
Total	$3,950.00	$86,508.88	$90,458.88	$13,638.81	$102,268.99	$115,907.80	$435,489.93	$16,027.68

*Including all local cooperative funds.

TABLE 1A

SUMMARY OF ALL RIBES ERADICATION 1918-1943 (INCLUSIVE)

State	Initial Eradication Work				Reeradication Work				
	Gross Acreage Reported Initially Worked	Net Acreage Worked in Control Area	Number Ribes Destroyed	Number 8-Hour Man-Days	Gross Acreage Reported Reworked	Net Acreage Reworked in Control Area: 1st Rework	Net Acreage Reworked in Control Area: Other Reworkings	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	1,643,135	1,643,135	321,862,807	1,330,775	419,955	362,583	57,372	57,827,547	457,708
Montana	131,679	131,679	17,116,705	93,494	14,436	10,818	3,618	1,826,896	17,783
Washington	124,787	124,787	28,716,349	105,225	43,789	32,987	10,802	6,127,563	39,569
Subtotal	1,899,601	1,899,601	367,696,461	1,529,494	479,180	406,388	71,792	65,782,006	515,060
Colorado	14,859	14,859	410,649	6,292	1,962	1,962		86,886	664
Wyoming	21,760	21,760	1,085,771	6,940					
Subtotal	36,619	36,619	1,496,420	13,232	1,962	1,962		86,886	664
Total	1,936,220	1,936,220	369,192,881	1,542,726	480,142	408,350	71,792	65,868,892	515,724

State	Initial and Reeradication						Per Acre			
	Gross Initial and Reworked Acreage Reported	Net Acreage: Initial	Net Acreage: 1st Rework	Net Acreage: Other Reworkings	Number Ribes Destroyed	Number 8-Hour Man-Days	Ribes: Initial Erad.	Ribes: Re-erad.	Man-Days: Initial Erad.	Man-Days: Re-erad.
Idaho	2,063,090	1,643,135	362,583	57,372	379,690,354	1,788,483	196	138	.81	1.09
Montana	146,115	131,679	10,818	3,618	18,943,601	111,277	130	127	.71	1.23
Washington	168,576	124,787	32,987	10,802	34,844,512	144,794	230	140	.84	.90
Subtotal	2,377,781	1,899,601	406,388	71,792	433,478,467	2,044,554	194	138	.81	1.08
Colorado	16,821	14,859	1,962		497,535	6,956	28	44	.42	.34
Wyoming	21,760	21,760			1,085,771	6,940	50		.32	
Subtotal	38,581	36,619	1,962		1,583,306	13,896	41	44	.36	.34
Total	2,416,362	1,936,220	408,350	71,792	435,061,773	2,058,450	191	137	.80	1.07

TABLE 2A

STATUS OF BLISTER RUST CONTROL, 1918-1943, (INCLUSIVE)

State	Acreage of White Pine in Net Control Area	Acreage of Net Control Area (White Pine and Protection Zones)	Acreage of Net Control Area Initially Worked	Acreage of Net Control Area Reworked: 1st Rework	Acreage of Net Control Area Reworked: Other Reworkings	Percentage Net Control Area Initially Worked	Percentage Net Control Area First Rework	Acreage in Net Control Area Still Needing Initial Protection	Acreage in Net Control Area Now on Maintenance Basis*
Idaho	2,123,104	2,123,104	1,643,135	362,583	57,372	77.4	17.1	479,969	680,500
Montana	190,782	190,782	131,679	10,818	3,618	69.0	5.7	59,103	69,700
Washington	169,349	169,349	124,787	32,987	10,802	73.7	19.5	44,562	49,100
Subtotal	2,483,235	2,483,235	1,899,601	406,388	71,792	76.5	16.4	583,634	799,300
Colorado	206,000**	206,000**	14,859	1,962		7.21	.95	191,141	8,000
Wyoming	251,700**	251,700**	21,760			8.65		229,940	9,000
Subtotal	457,700	457,700	36,619	1,962		8.00	.43	421,081	17,000
Total	2,940,935	2,940,935	1,936,220	408,350	71,792	65.9	13.9	1,004,715	816,300

*Maintenance - Any area on which the ribes are so scarce that danger from blister rust is negligible for an indefinite period. To assure the continuation of this safe condition requires periodic examinations and in some instances ribes eradication by scouting methods.

**Indefinite

TABLE 3A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1918-1943 (INCLUSIVE)
(Initial and Reeradication)

State	Regular and Cooperative*			Emergency W.P.A. and E.R.A.		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	619,865	102,449,770	506,450	500,970	91,269,072	411,890
Montana	26,831	3,865,968	28,626	57,800	6,300,829	41,591
Washington	34,165	8,225,070	29,871	39,973	13,632,288	53,107
Subtotal	680,861	114,540,808	564,947	598,743	111,202,189	506,588
Colorado				16,821	497,535	6,956
Wyoming				21,760	1,085,771	6,940
Subtotal				38,581	1,583,306	13,896
Total	680,861	114,540,808	564,947	637,324	112,785,495	520,484

State	Emergency C.C.C., S.C.S. and C.P.S.			Emergency P.W.A. or N.R.A.			Total Emergency Program		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	590,414	123,789,240	661,693	351,841	62,242,272	208,450	1,443,225	277,240,584	1,282,033
Montana	17,496	1,934,495	16,244	43,988	6,842,309	24,816	119,284	15,077,633	82,651
Washington	33,288	4,780,400	37,397	61,150	8,206,754	24,419	134,411	26,619,442	114,923
Subtotal	641,198	130,444,135	715,334	456,979	77,291,335	257,685	1,696,920	318,937,659	1,479,607
Colorado							16,821	497,535	6,956
Wyoming							21,760	1,085,771	6,940
Subtotal							38,581	1,583,306	13,896
Total	641,198	130,444,135	715,334	456,979	77,291,335	257,685	1,735,501	320,520,965	1,493,503

*This includes work of the Bureau, cooperating state and private agencies, Forest Service and Interior Department work with regular funds.

TABLE 4A

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIPS 1918-1943 (INCLUSIVE)

Land Ownership	Acreage of White Pine in Net Control Area	Net Control Area		Initial Eradication				Reeradication Work					Totals (Initial & Rework)					
		Total Acreage (W.P.& Prot. Zones)	Acreage Not Yet Worked Initially	Gross Acreage Reported Initially Worked	Net Acreage Worked in Control Area	Gross Number Ribes Destroyed	Gross Number 8-Hour Man-Days	Gross Acreage Reported Reworked	Net Acreage Reworked in Control Area 1st	Net Acreage Reworked in Control Area Others	Gross Number Ribes Destroyed	Gross Number 8-Hour Man-Days	Gross Initial and Reworked Acreage Reported	Net Acreage Initial and Rework Initial	Net Acreage Initial and Rework 1st Rework	Net Acreage Initial and Rework Other Reworkings	Gross Number Ribes Destroyed	Gross Number 8-Hour Man-Days
National Forests R-1	1,319,361	1,319,361	269,577	1,049,784	1,049,784	218,174,996	947,429	259,072	227,941	31,131	31,955,970	293,474	1,308,856	1,049,784	227,941	31,131	250,130,966	1,240,903
National Forests R-2,4	421,000°	421,000°	384,381°	36,619	36,619	1,496,420	13,232	1,962	1,962		86,886	664	38,581	36,619	1,962		1,583,306	13,896
Subtotal	1,740,361	1,740,361	653,958	1,086,403	1,086,403	219,671,416	960,661	261,034	229,903	31,131	32,042,856	294,138	1,347,437	1,086,403	229,903	31,131	251,714,272	1,254,799
Other Public Domain	30,905	30,905	13,908	16,997	16,997	2,819,272	11,053	6,939	5,900	1,039	877,593	8,235	23,936	16,997	5,900	1,039	3,696,865	19,288
National Parks	43,954	43,954	32,503	11,451	11,451	2,105,062	13,975	10,214	5,845	4,369	703,867	11,183	21,665	11,451	5,845	4,369	2,808,929	25,158
Indian Reservations	11,000°	11,000°	11,000°															
Subtotal (Federal)	1,826,220	1,826,220	711,369	1,114,851	1,114,851	224,595,750	986,689	278,187	241,648	36,539	33,624,316	313,556	1,393,038	1,114,851	241,648	36,539	258,220,066	1,299,245
State and Private	1,114,715	1,114,715	293,346	821,369	821,369	144,597,131	557,037	201,955	166,702	35,253	32,244,576	202,168	1,023,324	821,369	166,702	35,253	176,841,707	759,205
Grand Total	2,940,935	2,940,935	1,004,715	1,936,220	1,936,220	369,192,881	1,542,726	480,142	408,350	71,792	65,868,892	515,724	2,416,362	1,936,220	408,350	71,792	435,061,773	2,058,450
NATIONAL PARKS																		
Mount Rainier	8,254	8,254		8,254	8,254	1,640,507	10,070	9,397	5,028	4,369	546,175	10,220	17,651	8,254	5,028	4,369	2,186,682	20,290
Glacier	10,000	10,000	6,803	3,197	3,197	464,556	3,905	817	817		157,692	963	4,014	3,197	817		622,247	4,868
Yellowstone	12,900	12,900	12,900															
Grand Teton	5,800	5,800	5,800															
Rocky Mountain	7,000	7,000	7,000															
Total	43,954	43,954	32,503	11,451	11,451	2,105,062	13,975	10,214	5,845	4,369	703,867	11,183	21,665	11,451	5,845	4,369	2,808,929	25,158
INDIAN RESERVATIONS																		
Shoshone	11,000°	11,000°																
STATE AND PRIVATE LANDS																		
Idaho	1,018,918	1,018,918	263,786	755,132	755,132	126,341,410	491,023	182,315	153,117	29,198	28,105,148	179,534	937,447	755,132	153,117	29,198	154,446,558	670,557
Montana	34,327	34,327	14,600	19,727	19,727	2,801,217	15,054	3,431	2,057	1,374	484,663	4,767	23,158	19,727	2,057	1,374	3,285,880	19,821
Washington	61,470	61,470	14,960	46,510	46,510	15,454,504	50,960	16,209	11,528	4,681	3,654,765	17,867	62,719	46,510	11,528	4,681	19,109,269	68,827
Total	1,114,715	1,114,715	293,346	821,369	821,369	144,597,131	557,037	201,955	166,702	35,253	32,244,576	202,168	1,023,324	821,369	166,702	35,253	176,841,707	759,205
NATIONAL FORESTS																		
Clearwater	195,870	195,870	44,773	151,097	151,097	39,224,063	126,900	53,239	49,459	3,780	7,550,960	54,501	204,336	151,097	49,459	3,780	46,775,023	181,401
St. Joe	300,991	300,991	84,783	216,208	216,208	69,800,000	224,900	88,862	76,461	12,401	10,340,000	111,120	305,070	216,208	76,461	12,401	80,140,000	336,020
Coeur d'Alene°°	348,092	348,092	32,382	315,710	315,710	57,500,000	351,000	56,177	46,698	9,479	7,929,000	74,200	371,887	315,710	46,698	9,479	65,429,000	425,200
Kaniksu	327,993	327,993	69,939	258,054	258,054	37,800,000	170,094	50,606	47,379	3,227	4,951,469	41,600	308,660	258,054	47,379	3,227	42,751,469	211,694
Cabinet	73,954	73,954	12,020	61,934	61,934	10,581,933	50,035	9,023	6,779	2,244	1,076,141	10,943	70,957	61,934	6,779	2,244	11,658,074	60,978
Kootenai	72,461	72,461	25,680	46,781	46,781	3,269,000	24,500	1,165	1,165		108,400	1,110	47,946	46,781	1,165		3,377,400	25,610
Subtotal Region 1	1,319,361	1,319,361	269,577	1,049,784	1,049,784	218,174,996	947,429	259,072	227,941	31,131	31,955,970	293,474	1,308,856	1,049,784	227,941	31,131	250,130,966	1,240,903
Region 2	394,000	394,000	357,381	36,619	36,619	1,496,420	13,232	1,962	1,962		86,886	664	38,581	36,619	1,962		1,583,306	13,896
Region 4	27,000	27,000	27,000															
Total	1,740,361	1,740,361	653,958	1,086,403	1,086,403	219,671,416	960,661	261,034	229,903	31,131	32,042,856	294,138	1,347,437	1,086,403	229,903	31,131	251,714,272	1,254,799

°Indefinite

°°Includes National Forest land in Mt. Spokane operation

TABLE 5A

SUMMARY OF ALL OTHER CONTROL WORK, 1918-1943 (INCLUSIVE)

State	Cultivated Black Current Eradication				Nursery Sanitation						
					Number of Nurseries		Number Acres Worked				
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Man-Days	Sanitation Zone Maintained	Sanitation Zone Abandoned	Nurseries Maintaining Zones	Nurseries Which Abandoned Zones	Total Acreage	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	5,233	2,471	16,553	2,341							
Montana	1,311	798	5,080	514	1		9,391		9,391	1,536,723	7,919
Washington	50,050	5,378	78,226	4,218		1		378	378	20,275	640
Subtotal	56,594	8,647	99,859	7,073	1	1	9,391	378	9,769	1,556,998	8,559
Wyoming					1		2,038		2,038	73,786	567
Total	56,594	8,647	99,859	7,073	2	1	11,429	378	11,807	1,630,784	9,126

State	Mapping Control Areas		Treatment of Infected White Pines			
	Number Acres Mapped (W.P.& Prot. Zones)	Number 8-Hour Man-Days	Total Number Pines Examined	Number Infected Pines Cut Down	Number Infected Pines From Which Cankers Removed	Number 8-Hour Man-Days
Idaho	3,711,465	5,562	1,260,433	48,874	1,016,229	3,210
Montana	356,175	918	73,076	3,987	67,208	1,189
Washington	167,141	425	460,720	10,578	391,557	1,261
Subtotal	4,234,781	6,905	1,794,229	63,439	1,474,994	5,660
Colorado	206,000	290				
Wyoming	323,700	351				
Subtotal	529,700	641				
Total	4,764,481	7,546	1,794,229	63,439	1,474,994	5,660

TABLE 6A

SUMMARY OF ALL EXPENDITURES, 1918-1943 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including All Coop. Funds)		Grand Total (State and Federal Funds)	Recapitulation of Regular Funds			
		Indirect Aid	Direct Aid (Ribes Erad.)		B.P.I. & B.E.P.Q.	Forest Service	National Parks	Total
Idaho	$11,061,102.99	$226,311.00	$296,672.53	$11,584,086.52	$1,513,622.06	$3,277,459.60		$4,791,081.66
Montana	1,081,380.19	111,500.00		1,192,880.19	219,749.87	257,011.64	$ 9,845.76	486,607.27
Washington	1,252,627.29	79,000.00		1,331,627.29	232,584.51	210,067.76	54,392.07	497,044.34
Subtotal	13,395,110.47	416,811.00	296,672.53	14,108,594.00	1,965,956.44	3,744,539.00	64,237.83	5,774,733.27
Colorado	79,290.00	11,700.00		90,990.00	11,852.04			11,852.04
Wyoming	76,705.65	4,700.00		81,405.65	11,314.28			11,314.28
Subtotal	155,995.65	16,400.00		172,395.65	23,166.32			23,166.32
Total	$13,551,106.12	$433,211.00	$296,672.53	$14,280,989.65	$1,989,122.76	$3,744,539.00	$64,237.83	$5,797,899.59

State	Recapitulation of Emergency Funds										
	Federal W.P.A.			State W.P.A. (All Bureau)	C.C.C. and S.C.S.			P.W.A.			Grand Total
	Bureau	Forest Service	Total		Forest Service and State Camps	Dept. Interior	Total	Bureau	Forest Service	Total	
Idaho	$2,002,140.71	$421,155.19	$2,423,295.90	$14,160.15	$ 992,539.50		$ 992,539.50	$470,841.62	$1,369,184.16	$1,840,025.78	$6,270,021.33
Montana	136,847.11	136,851.46	333,698.57		18,660.00	$ 4,249.50	22,909.50	88,306.79	149,859.06	238,164.85	594,772.92
Washington	459,112.87		459,112.87	854.30	37,057.50	19,039.00	56,095.50	105,199.60	134,320.68	239,520.28	755,582.95
Subtotal	3,598,100.69	558,006.65	4,216,107.34	15,014.45	1,048,257.00	23,287.50	1,071,544.50	664,348.01	1,653,362.90	2,317,710.91	7,620,377.20
Coloredo	59,396.51		59,396.51					8,041.45		8,041.45	67,437.96
Wyoming	58,293.96		58,293.96					7,107.41		7,107.41	65,391.37
Subtotal	117,690.47		117,690.47					15,148.86		15,148.86	132,829.33
Total	$3,775,791.16	$558,006.65	$4,333,797.81	$15,014.45	$1,048,257.00	$23,287.50	$1,071,544.50	$679,496.87	$1,653,362.90	$2,332,859.77	$7,753,206.53

Organization of the Northwestern Regional Office

1. Regional Leader in Charge, H. E. Swanson, Pathologist

2. Assistant Regional Leader, F. O. Walters, Pathologist

3. Cooperative Local Control:

   a. Clearwater Operation, Idaho:
      Technical Supervisor, H. J. Faulkner, Forester
      Checking Foreman, J. C. Gonyou, Field Aid
   b. St. Joe Operation, Idaho:
      Technical Supervisor, F. J. Heinrich, Pathologist
      Checking Supervisor, W. F. Painter, Pathologist
      Camp Superintendent, G. W. Schmaltz; Agent
      Checker, R. E. Myers, Agent
   c. Coeur d'Alene Operation, Idaho:
      Technical Supervisor, M. C. Riley, Forester
   d. Kaniksu Operation, Idaho-Washington:
      Technical Supervisor, H. A. Brischle, Pathologist
      Unit Supervisor, L. J. Easley, Agent
   e. Montana Operation:
      Technical Supervisor, A. S. Skoglund, Pathologist
   f. National Parks:
      Technical Supervisor, M. C. Riley, Forester

4. Projects:

   a. Control Investigations:
      C. R. Stillinger, Pathologist
      C. M. Chapman, Scientific Aid
   b. Education and Information:
      H. M. Cowling, Scientific Aid
   c. Methods Development:
      V. D. Moss*, Forest Ecologist
      J. F. Breakey*, Pathologist

5. Business Administration and Clerical:

   a. E. G. Schmidt, Administrative Assistant
      E. K. LaPrey, Field Assistant
      L. C. Miller, Automobile Mechanic
   b. M. L. McWold, Clerk
      M. M. McLean, Clerk-Stenographer
   c. L. E. Klatt, Clerk
      J. R. Pringle, Clerk-Stenographer
      M. Wilson, Clerk-Stenographer
      L. M. Metzger, Clerk-Stenographer
      B. M. Westberg, Clerk-Stenographer
   d. H. D. Langley, Administrative Assistant - Personnel

*Personnel assigned to Northwestern Region by H. R. Offord. Work Project: BLR-1-6.

Cooperative Blister Rust Control on State and Private Lands (Work Project BLR-3-4)

Introduction

Cooperative ribes eradication in 1943 on state and privately owned lands under the provisions of the Lea Act was confined to the state of Idaho where white pine lands in these ownerships constitute 48 per cent of the control area. In Montana and Washington, state and private lands comprise about 28 per cent of the control area which for the most part occurs in small blocks intermingled with federal lands. The state of Idaho and the Clearwater, Potlatch and Priest Lake Timber Protective Associations continued with their financial participation in the program, with the Idaho legislature appropriating $25,000 for the period April 1, 1943, to June 30, 1945, and the Associations contributing on the annual basis of two cents an acre for the entire area in the protective district.

1943 Field Program

Field work was performed on each of the three Timber Protective Associations. The entire project consisted of 7 camps and approximately 372 workers. Crews were made up almost entirely of 16 to 17 year old boys recruited by the State Forester and State Land Board in south Idaho and by the Blister Rust Control Office from the Spokane territory. As more fully described in the regional report, the work performed by this type of crew was quite satisfactory under the present handicaps of the war emergency. In view of the urgent need to perform ribes eradication now before further intensification of blister rust on many areas, the continuance of the project with this class of labor during the war period is fully justified.

Progress

In 1943, the cooperative program worked 10,194 acres of which 985 acres were initial and 9,209 acres reeradication. Including work done by Forest Service crews on state and private lands in Idaho, Washington and Montana the total acreage of this class of ownership worked was 12,446, with 1,675 acres worked initially and 10,771 acres reworked. The progress from 1923 through 1943 on state and private lands is as follows: 821,369 acres first working, 166,702 acres second working, 35,253 acres third working, with 293,346 acres yet to receive initial working.

Review of Present Status of Control Program

The status of blister rust control on state and private lands is similar to that for the region as a whole in that the major portion of the area supporting white pine stands over 20 years old is either adequately protected or the control work has progressed to the point that another working or mop-up will complete the job. Some losses were sustained where the control program was not sufficiently large in the past to reach all areas before blister rust became heavily entrenched. Control work on state and private lands kept apace with that on federal lands until about 1940 when the emergency relief work projects which had previously accounted for most

of the work on state and private lands reached a low point. The large proportion of older stands in state and private ownership contributed a great deal to the earlier rapid progress because the cost of control and number of workings required in the older stands are less than in the younger stands.

While the mature stands are being cut earlier than was anticipated some years ago in order to meet the heavy demands for war purposes, it is well to point out at this time the value of the control work in such stands. Reference is made to a study in 1936 by the Division of Forest Pathology, Bureau of Plant Industry in merchantable white pine in north Idaho. (Buchanan, T. S. 1938a. Blister Rust Damage to Merchantable Western White Pine. Jour. For. 36: 321-328.) This paper should be reviewed by all who are interested in the problem.

A few important facts in connection with the estimated probable damage to the trees examined near Pierce, Idaho, are presented. First, blister rust infection was not on the pine prior to 1923 and did not become general on all the trees examined until after 1927. Since ribes were eradicated in the fall of 1933, the pines examined were exposed to infection for a period of only 6 years. Second, in this short period of exposure, three of the twelve trees studied had more than 1,000 cankers, the other nine had from 86 to 925 cankers. Third, on the basis of the infection present in 1936 which occurred prior to ribes eradication it was estimated that three of the trees would be seriously damaged by 1941, 1943 and 1950 respectively. In respect to the other 9 trees the estimated years when serious damage would be effected ranged from 1953 to 1972, with three trees not having a canker which would cause damage. Logging was started in this locality in 1941. While these pine were exposed to heavy ribes concentrations not general throughout the mature type, the results of this study are indicative of what might happen to commercial stands without protection from blister rust. It is also important to note that had the rust been allowed to develop unrestricted without removal of ribes, the damage picture would have become progressively worse from year to year. While generally mature timber is subject to damage only over the long period, this time may be materially shortened through a combination of the weakening of trees by blister rust followed by beetle attack. In view of these circumstances, the removal of heavy ribes concentrations was necessary throughout most of the mature stands during the emergency relief work program to prevent serious losses from occurring in commercial stands.

The status of control work in stands less than 20 years old is not favorable. The young stands which had become established prior to 1930, so that initial and second eradication could be performed during the period of large scale control work (1933-1936) are in good condition. The cutover acreage coming back to white pine as a result of logging during the last few years has been much larger than the dwindling facilities for work on state and private lands could cover on ribes eradication. Due to this inadequate program, many of these young stands have received no protection and the rust is building up rapidly. The perpetuation of white pine on these cutover areas in state and private ownership, representing some of the best forest land in the region, is the most serious problem in control of blister rust in the region. Upon the completion of the area classification survey now under way, a more detailed account of the status of the control program will be available.

Progress Tables.

The following tables present the work performed by the Bureau of Entomology and Plant Quarantine under its cooperative, regular, and emergency relief work programs. While this work was primarily directed to state and private lands, the intermingled ownership of forest lands and the changes in ownership necessitate a recapitulation of the acreage worked in order to show the progress according to present ownership.

TABLE 1

COOPERATIVE RIBES ERADICATION ON STATE AND PRIVATE LANDS IN IDAHO, 1943

Working	Number Acres Worked				Man-Days	Ribes Destroyed	Per Acre	
	State	Private	National Forest	Total			Man-Days	Ribes
Clearwater Timber Protective Association								
Second	392	1,960		2,352	2,848	520,126	1.21	221
Third	168	1,811		1,979	2,078	155,647	1.05	79
Total	560	3,771		4,331	4,926	675,773	1.14	156
Potlatch Timber Protective Association								
First	80	905		985	762	138,580	.77	141
Second	583	1,417	645	2,645	2,731	85,044	1.03	32
Third			45	45	41	495	.91	11
Total	663	2,322	690	3,675	3,534	224,119	.96	61
Priest Lake Timber Protective Association								
Second	690	642		1,332	1,655	103,846	1.24	78
Third	856			856	1,309	58,909	1.53	69
Total	1,546	642		2,188	2,964	162,755	1.35	74
Totals								
First	80	905		985	762	138,580	.77	141
Second	1,665	4,019	645	6,329	7,234	709,016	1.14	112
Third	1,024	1,811	45	2,880	3,428	215,051	1.19	75
Total	2,769	6,735	690	10,194	11,424	1,062,647	1.12	104

TABLE 2

SUMMARY OF COOPERATIVE RIBES ERADICATION ON STATE AND PRIVATE LANDS IN IDAHO, 1928-1943

Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
				Man-Days	Ribes
Clearwater Timber Protective Association					
First	24,005	16,862	3,769,434	.70	157
Second	7,215	5,945	899,778	.82	125
Third	6,292	6,599	399,712	1.05	64
Total	37,512	29,406	5,068,924	.78	135
Potlatch Timber Protective Association					
First	18,058	14,246	4,002,581	.79	222
Second	11,974	9,263	447,029	.77	37
Third	45	41	495	.91	11
Total	30,077	23,550	4,450,105	.78	148
Priest Lake Timber Protective Association					
First	111,419	31,454	9,021,759	.28	81
Second	8,971	7,336	911,681	.82	102
Third	2,487	2,757	420,615	1.11	169
Total	122,877	41,547	10,354,055	.34	84
Totals					
First	153,482	62,562	16,793,774	.41	109
Second	28,160	22,544	2,258,488	.80	80
Third	8,824	9,397	820,822	1.06	93
Total	190,466	94,503	19,873,084	.50	104

TABLE 3

SUMMARY OF RIBES ERADICATION PERFORMED BY
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, 1923-1943

Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
				Man-Days	Ribes
Idaho					
First	767,232	501,217	125,453,905	.65	164
Second	149,023	142,345	24,772,502	.96	166
Third	22,107	25,101	2,498,648	1.14	113
Total	938,362	668,663	152,725,055	.71	163
Montana					
First	65,469	30,728	5,913,038	.47	90
Second	1,961	2,577	565,047	1.31	288
Third	648	777	59,040	1.20	91
Total	68,078	34,082	6,537,125	.50	96
Washington					
First	48,156	46,892	14,422,701	.97	299
Second	11,920	12,212	2,634,166	1.02	221
Third	4,681	4,036	768,915	.86	164
Total	64,757	63,140	17,825,782	.98	275
Subtotal - Idaho, Montana, Washington					
First	880,857	578,837	145,789,644	.66	166
Second	162,904	157,134	27,971,715	.96	172
Third	27,436	29,914	3,326,603	1.09	121
Total	1,071,197	765,885	177,087,962	.71	165
Colorado and Wyoming					
First	36,619	13,232	1,496,420	.36	41
Second	1,962	664	86,886	.34	44
Total	38,581	13,896	1,583,306	.36	41
Totals - All States					
First	917,476	592,069	147,286,064	.65	161
Second	164,866	157,798	28,058,601	.96	170
Third	27,436	29,914	3,326,603	1.09	121
Total	1,109,778	779,781	178,671,268	.70	161

TABLE 4

PROGRESS OF BLISTER RUST CONTROL ON STATE AND PRIVATE LANDS, 1943

State	Working	Number of Acres Worked		
		State	Private	Total
Idaho	First	120	1,299	1,419
	Second	2,013	4,406	6,419
	Third	1,024	3,157	4,181
	Total	3,157	8,862	12,019
Montana	First		256	256
	Second		171	171
	Total		427	427
Total	First	120	1,555	1,675
	Second	2,013	4,577	6,590
	Third	1,024	3,157	4,181
	Total	3,157	9,289	12,446

TABLE 5

PROGRESS OF BLISTER RUST CONTROL ON STATE AND PRIVATE LANDS, 1923-1943

State	Working	Number of Acres Worked		
		State	Private	Total
Idaho	First	264,138	490,994	755,132
	Second	50,110	103,007	153,117
	Third	8,892	20,306	29,198
	Total	323,140	614,307	937,447
Montana	First	734	18,993	19,727
	Second	1	2,056	2,057
	Third		1,374	1,374
	Total	735	22,423	23,158
Washington	First	6,832	39,678	46,510
	Second	3,935	7,593	11,528
	Third	2,114	2,567	4,681
	Total	12,881	49,838	62,719
Total	First	271,704	549,665	821,369
	Second	54,046	112,656	166,702
	Third	11,006	24,247	35,253
	Total	336,756	686,568	1,023,324

TABLE 6

EXPENDITURES FOR CALENDAR YEAR, 1943
WORK PROJECT BLR-3-4, IDAHO

Timber Protective Association	Federal	State and Private	Total
Clearwater	$ 39,814.54	$ 4,201.71	$ 44,016.25
Potlatch	31,445.69	4,018.35	35,464.04
Priest Lake	31,008.76	4,418.75	35,427.51
Total	$102,268.99	$12,638.81	$114,907.80

Note: Total expenditures from state and private funds on blister rust control in Idaho for the period 1928-1943:

State	$174,705.04
Private	119,967.49
Total	$294,672.53

Blister Rust Control Operation on National Forests
(Financial Project BLR-4)

Introduction

Blister rust control work was continued by the Forest Service in 1943, with assistance from the Bureau of Entomology and Plant Quarantine in planning and technical direction, on the Clearwater, St. Joe, Coeur d'Alene, Kaniksu and Cabinet National Forests. Available labor did not permit a control project on the Kootenai. The regional program included 37 camps with 1,206 workers. Except for 87 Italian internees, who turned out to be very satisfactory workers, the crews were made up of 16 and 17 year old boys recruited from all parts of the country. These boys did not equal a normal crew and yet in view of the urgent need for ribes eradication work now to prevent serious damage in many stands their employment is fully justified. In a few cases, the work performed was better than in the two previous years. Because of the short season, it was not possible to utilize the full benefit of the training put into these boys. Whereas there were practically no experienced workers returning to the project in 1943, a large number of the boys employed this year will be available in 1944 which will strengthen the crew organization.

Blister rust crews were called upon to fight fire but these demands were not so great as to cause any serious disruption in blister rust work. In two or three instances, the loss of time prevented the completion of ribes eradication on the particular camp areas.

Progress

In 1943, Forest Service crews worked 25,740 acres of which 7,640 were initial and 18,100 reeradication. The progress to date on National Forest lands is as follows: 1,049,784 acres first working; 227,941 acres second working; 31,131 acres third working. Working has been deferred on 73,922 acres and 269,577 acres are unworked.

Review of Present Status of Control Program

Upon the completion of the area classification survey initiated in the fall of 1943, it will be possible to present a more informative picture of the present status of the control program. In general, the present status of control on National Forest land is similar to that for the region as a whole including all ownerships. In view of the amount of funds which have been available during the last three years the situation on federal lands could have been much better but the serious labor shortage during this period has caused a definite slow-up in the progress of the work.

Since the inception of control work on National Forest lands, substantial progress has been made in that most of the white pine stands over 20 years old are well protected or are in such a condition that another working or mop-up will complete the job. This does not include the more remote or isolated blocks of white pine which were not reached under the large emergency relief work programs and which became heavily infected with blister rust 8 or 10 years ago. Consideration has been given for some time to drop these areas and this

is being done in the recent area classification survey. As compared to the very favorable protection conditions in stands over 20 years old, the situation in the 0-20 year age class is serious. While the major portion of the control effort has been concentrated in this age class during the last few years, the reduced program in recent years has prevented keeping apace with the necessary work. Generally these young stands require three workings to establish control. The areas on which new white pine has become established in recent years following logging or fires either have received no control work or sufficient time has not elapsed in which to complete the necessary rework. Areas in the upper bracket of this age class (15-20 years) are in good condition if the reworkings have been performed, but there is a considerable acreage on which rework is long overdue.

Thus far the white pine cutover acreage on National Forest lands has not built up to the heavy work load on the blister rust control program as is the case on state and private lands. In connection with stand improvement areas, particularly on the Coeur d'Alene National Forest, where decadent hemlock is removed to permit the reestablishment of white pine following logging, a very difficult problem is arising. Very large numbers of ribes come in following the disturbance of logging and stand improvement on these former white pine-hemlock areas with the result that a high percentage of the white pine seedlings are immediately infected. Standard ribes eradication procedures appear impractical to protect such areas, and careful thought is being given from the standpoint of timber management and blister rust control for the future treatment of this type of condition.

Additional detailed information covering disease surveys, infection conditions, progress of control for the various national forests is presented in the individual operation reports.

Progress Tables

The following tables show the work performed by Forest Service crews, together with a report as to the acreage worked in the past under various programs which is now National Forest land.

TABLE 1

RIBES ERADICATION BY FOREST SERVICE CREWS, 1943

Working	Number Acres Worked					Man-Days	Ribes Destroyed	Per Acres	
	National Forest	Public Domain	State	Private	Total			Man-Days	Ribes
Clearwater National Forest									
First	1,295				1,295	3,949	646,943	3.05	500
Second	376				376	993	54,651	2.64	165
Total	1,671				1,671	4,942	701,594	2.96	420
St. Joe National Forest									
Second	1,101	270		252	1,623	1,625	55,078	1.00	34
Third	2,622	837		1,202	4,661	7,571	282,151	1.62	61
Total	3,723	1,107		1,454	6,284	9,196	337,229	1.46	54
Coeur d'Alene National Forest									
First	1,220				1,220	2,456	126,719	2.01	104
Second	1,612				1,612	2,029	98,294	1.26	61
Third	736				736	1,467	69,197	1.99	94
Total	3,568				3,568	5,952	294,210	1.67	82
Kaniksu National Forest									
First	1,788	160	40	394	2,382	2,545	327,186	1.07	137
Second	6,171		348	135	6,654	5,547	394,384	.83	59
Third	1,203			144	1,347	1,432	144,228	1.06	107
Total	9,162	160	388	673	10,383	9,524	865,798	.92	83
Cabinet National Forest									
First	2,487			256	2,743	2,359	296,869	.86	108
Second	531			171	702	1,223	37,794	1.74	54
Third	389				389	137	4,704	.35	12
Total	3,407			427	3,834	3,719	339,367	.97	89
Totals - All Forests									
First	6,790	160	40	650	7,640	11,309	1,397,717	1.48	133
Second	9,791	270	348	558	10,967	11,417	640,201	1.04	58
Third	4,950	837		1,346	7,133	10,607	500,280	1.49	70
Total	21,531	1,267	388	2,554	25,740	33,333	2,538,198	1.29	99

TABLE 2

RIBES ERADICATION BY FOREST SERVICE CREWS, 1930-1943

National Forest	Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre	
					Man-Days	Ribes
Clearwater	First	187,889	161,440	47,895,978	.86	255
	Second	46,619	47,327	6,519,213	1.02	140
	Third	3,214	3,237	351,287	1.01	109
	Total	237,722	212,004	54,766,478	.89	230
St. Joe	First	261,060	272,153	82,014,341	1.04	314
	Second	86,558	104,282	10,239,631	1.20	118
	Third	19,755	30,204	2,012,427	1.53	102
	Total	367,373	406,579	94,266,399	1.11	257
Coeur d'Alene	First	269,436	303,995	48,651,249	1.13	181
	Second	50,410	67,521	7,759,901	1.34	154
	Third	10,572	14,076	1,139,844	1.33	108
	Total	330,418	385,592	57,550,994	1.17	174
Kaniksu	First	225,895	140,233	30,501,075	.62	135
	Second	46,012	34,538	4,443,499	.75	97
	Third	3,476	2,238	268,902	.64	77
	Total	275,383	177,009	35,213,476	.64	128
Cabinet	First	43,184	45,602	9,076,781	1.06	210
	Second	6,769	9,107	766,531	1.35	113
	Third	2,970	2,935	160,555	.99	54
	Total	52,923	57,644	10,003,867	1.09	189
Kootenai	First	19,829	13,259	1,662,331	.67	84
	Second	1,271	1,424	118,031	1.12	93
	Total	21,100	14,683	1,780,362	.70	84
Totals All Forests	First	1,007,293	936,682	219,801,755	.93	218
	Second	237,639	264,139	29,846,806	1.11	126
	Third	39,987	52,690	3,933,015	1.32	98
	Total	1,284,919	1,253,511	253,581,576	.98	197

TABLE 3

PROGRESS OF BLISTER RUST CONTROL ON
NATIONAL FOREST LANDS, 1943

National Forest	Number of Acres Worked			
	First	Second	Third	Total
Clearwater	1,295	376		1,671
St. Joe		1,746	2,667	4,413
Coeur d'Alene	1,220	1,612	736	3,568
Kaniksu	1,788	6,171	1,203	9,162
Cabinet	2,487	531	389	3,407
Total	6,790	10,436	4,995	22,221

TABLE 4

PROGRESS OF BLISTER RUST CONTROL ON NATIONAL FOREST LANDS, 1923-1943
(Present Ownership)

National Forest	Number of Acres Worked				Acres Unworked	Acres Deferred	Acres in Control Area
	First	Second	Third	Total			
Clearwater	151,097	49,459	3,780	204,336	44,773	8,860	204,730
St. Joe	216,208	76,461	12,401	305,070	84,783	11,089	312,080
Coeur d'Alene	315,710	46,698	9,479	371,887	32,382	10,303	358,395
Kaniksu	258,054	47,379	3,227	308,660	69,939	26,202	354,195
Cabinet	61,934	6,779	2,244	70,957	12,020	3,034	76,988
Kootenai	46,781	1,165		47,946	25,680	14,434	86,895
Total	1,049,784	227,941	31,131	1,308,856	269,577	73,922	1,393,283

Note: 36,619 acres first working; 1,962 acres second working; National Forest lands in Colorado and Wyoming

Expenditures by the Forest Service for Blister Rust Control

Calendar Year 1943

Clearwater	$ 71,902.85
St. Joe	131,450.50
Coeur d'Alene	87,127.25
Kaniksu	102,808.34
Cabinet	42,200.99
Total	$435,489.93

Total Expenditures, 1930-1943

Forest	Regular	ERA(WPA)	NIRA(PWA)	Total
Clearwater	$ 759,169.19	$ 78,808.87	$ 334,645.93	$1,172,623.99
St. Joe	1,530,396.19	6,983.40	376,356.66	1,913,736.25
Coeur d'Alene	674,189.50	197,410.60	472,399.21	1,343,999.31
Kaniksu	523,772.48	137,952.32	320,103.04	981,827.84
Cabinet	217,935.50	108,618.46	149,858.06	476,412.02
Kootenai	39,076.14	28,233.00		67,309.14
Total	$3,744,539.00	$558,006.65	$1,653,362.90	$5,955,908.55

Blister Rust Control on National Parks
(Financial Project BLR-5)

Introduction

The blister rust control program was continued on Mount Rainier and Glacier during 1943. Progress was seriously curtailed as a result of the labor situation, necessitating the employment of 16 and 17 year old boys and the use of Civilian Public Service workers. Bad weather conditions causing an abnormally short working season also handicapped progress. In view of the amount of blister rust infection present in Mount Rainier and the urgent need for getting protection established as soon as possible, the employment of these boys is justified. While they do not equal a normal crew in performance, their work is acceptable under present emergencies. Accomplishments by the Civilian Public Service crew assigned to blister rust work on Glacier were disappointing and it would appear that no substantial progress can be expected with this type of labor.

Consideration was given to starting control work on Yellowstone in 1943 but because of the shortage of labor and also the lack of experienced blister rust supervisors to assign to a new project, it was decided to postpone the initiation of a control project on this park until after the war. For several years, efforts had been made to get a project under way in order to complete the protection of the pine before blister rust becomes established, so it is not without some sacrifice and the possibility of a more difficult job later on that the work is being postponed at this time.

Review of the Present Status of Control

Mount Rainier. Initial working was completed on 8,254 acres by 1938. No extensions of this work are contemplated because the rework program started prior to 1938 and carried on each year since was not adequate to keep ahead of the spread and intensification of the rust which was already present. Consequently, it was necessary to abandon the Stevens-Cowlitz block because of the great amount of damaging infection. The values which can yet be protected on this area do not justify the cost of completing the job of ribes eradication. The initial work by CCC labor made a great reduction in the ribes population over this area which caused a correspondingly great reduction in the volume of blister rust cankers forming each year. This will only serve to delay for an indeterminable period the elimination of pine from the area and it is possible that in some parts of the stand where the ribes were thoroughly eradicated on initial working, the white pine may continue to survive for a long time.

The difficult problem of protecting white pine areas in Mount Rainier, as demonstrated by observation and experience and further substantiated by recent findings in the research program, makes this retrenchment advisable. The frequency and long duration of heavy fogs or clouds enveloping the white pine stands accompanied by temperatures and air currents favorable to rust development and spread are characteristic of the high elevations in the park. Long distance spread from highly susceptible ribes to Pinus albicaulis is another factor contributing to the control problem. Unlike the protection of

white pine grown for commercial purposes which stands generally are not surrounded by conditions so favorable to blister rust and where control is designed to bring the pine stand through its normal rotation for harvesting, protection of the pine stands in the parks must be complete and permanent, for these trees are not to be cut when they reach merchantable size. Consequently, where a certain amount of new infection in a commercial white pine stand would cause no damage, this situation could not be allowed to continue indefinitely for white pine which is to remain for its natural life as in the National Parks.

In view of these circumstances, the control effort since 1941 has been focused on the Longmire, Silver Forest and White River blocks and the future control plans will be concerned with these areas only. Even though blister rust infection was already present on these areas when control work was started, ribes eradication was performed sufficiently early to retard any appreciable build-up of infection and subsequent rework has left the areas in good condition. For reasons already mentioned, maintenance work, particularly in stream type, and periodic coverage of troublesome portions of the areas for the purpose of eliminating cankers will be necessary.

Glacier. The conditions on white pine areas considered for protection from blister rust in Glacier are not as favorable for rust development as in the case of Mount Rainier. The absence of Ribes bracteosum and R. petiolare reduces the possibility of any abnormally long distances of spread from ribes to pine and in most cases a normal protection zone should suffice. While blister rust was present on ribes and pine when control work was started in 1939, no new pine infection has been found on the worked areas. The initial advantage gained in starting ribes eradication before blister rust became well established is being lost as a result of the size and nature of the control program of the last two years. The ribes eradication program should be pushed to completion within the shortest time possible to avoid high maintenance costs in the future.

Summary

The following tables present a brief summary of the progress of blister rust control on National Parks.

TABLE 1

RIBES ERADICATION ON NATIONAL PARKS, 1943

National Park	Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre Man-Days	Per Acre Ribes
Mount Rainier	Third	425	1,370	51,038	3.22	120
Glacier	First	302	771	103,559	2.55	343
	Second	86	200	35,086	2.33	408
	Total	388	971	138,645	2.50	357
Grand Total		813	2,341	189,683	2.88	233

TABLE 2

RIBES ERADICATION ON NATIONAL PARKS, 1930-1943

National Park	Working	Acres Worked	Man-Days	Ribes Destroyed	Per Acre Man-Days	Per Acre Ribes
Mount Rainier	First	8,254	10,070	1,640,507	1.22	199
	Second	5,028	5,941	400,913	1.18	80
	Third	4,369	4,279	145,262	.98	33
	Total	17,651	20,290	2,186,682	1.15	124
Glacier	First	3,197	3,905	464,555	1.22	145
	Second	817	963	157,692	1.18	193
	Total	4,014	4,868	622,247	1.21	155
Totals	First	11,451	13,975	2,105,062	1.22	184
	Second	5,845	6,904	558,605	1.18	96
	Third	4,369	4,279	145,262	.98	33
	Total	21,665	25,158	2,808,929	1.16	130

TABLE 3

PROGRESS OF CONTROL ON NATIONAL PARKS

National Park	Acres in Control Area	Acres Worked				Acres Unworked Initially
		First	Second	Third	Total	
Mount Rainier	8,254	8,254	5,028	4,369	17,651	
Glacier	10,000	3,197	817		4,014	6,803
Yellowstone	12,900					12,900
Grand Teton	5,800					5,800
Rocky Mountain	7,000					7,000
Total	43,954	11,451	5,845	4,369	21,665	32,503

Statement of funds expended by National Park Service for blister rust control work:

National Park	1943 Calendar Year	All Years
Mount Rainier	$14,937.34	$54,392.07
Glacier	1,090.34	9,845.76
Total	$16,027.68	$64,237.83

Note: Above expenditures represent regular funds. No emergency funds were expended and the cost of CCC work is not included.

BLISTER RUST CONTROL, INLAND EMPIRE, 1943

By
Frank O. Walters
Assistant Regional Leader

A summary of the progress of blister rust control in the Inland Empire is given below by combining the following operations.

1. Clearwater operation
2. St. Joe operation
3. Coeur d'Alene operation
4. Kaniksu operation
5. Montana operation (Kootenai and Cabinet Forests)
6. Mount Spokane operation (no work since 1941)

The commercially important white pine areas of the Northwestern Region are located in northern Idaho, eastern Washington and western Montana and are considered as a unit known as the Inland Empire.

To secure workers it was necessary to recruit 16 and 17 year old boys. The boys for the Forest Service camps came from the East and Middle West as well as the West. The workers used in the Bureau camps were secured largely from south Idaho and the Spokane area. To replace the experienced overhead lost to the armed forces and industry, several high school instructors without previous eradication experience were hired, given preseason training and placed in charge of camps.

This year wages were paid on a monthly basis. In the past, due to early season rains, loss of wages has resulted while board charges continued. This was the cause of considerable dissatisfaction on the part of the workers and increased the labor turnover. During rainy periods it has been possible to work at canker elimination, wood cutting, construction of work trails and maintenance of trails.

This season most of the areas on which work was performed involved second or third workings, and more efficient work is required to put the ground in the desired shape than is the case in initial eradication. The fact should be appreciated that these boys were assigned to do the work formerly done by fully-matured individuals. Instability is a mark of this age group, and the labor turnover was large, yet by close supervision and through the use of a well-rounded training program the per man-day output was held up to 88 per cent of that of last season while the efficiency remained practically the same. It is significant that by continuing the program almost 36,000 acres of white pine lands were given much needed protection. This means the preservation of a vital resource that in a few years will help to offset the terrific drain now being made by the demands of war.

This year the Bureau of Entomology and Plant Quarantine carried on control work on state and private lands with a total of 7 camps and 372 men, while the Forest Service operating largely on federal lands had 37 camps and 1,206 men. Twenty-three per cent less acreage was covered and fourteen per cent fewer man-days were expended during the current season than last year.

This year fire was not a major factor in interfering with work. The St. Joe Forest Service camps spent four days fighting fire on the Nezperce Forest and the Cabinet crews were on the Wyoming fire for twelve days. We are now entering the very critical phase of the control job. The more perplexing problems occur in the younger age classes. Most of the advance reproduction, pole and mature stands can be given what additional protection is necessary at a reasonable cost. It has been possible to perform rework on only a small part of the large acreages of younger age classes covered under the expanded program carried on during the emergency period from 1933 to 1936. Since 1941 the man power shortage has been so acute that the progress has been further curtailed, and as a net result there has accumulated a far greater acreage in need of immediate working than the size of recent programs can possibly keep pace with. In addition, the accelerated timber cutting of recent years has greatly added to the ever-mounting area of cutover land in need of attention.

Certain cutover and stand improvement areas have created complex problems. Profuse and prolonged germination of ribes and dense vegetative cover on these areas make effective control measures difficult and costly. Studies as to suitable methods for handling such areas are under way.

The very favorable year for the spread of rust experienced during the summer and fall of 1941 indicates the severity of the disease where the ribes remaining per acre exceed the allowable standards. The distance of spread under certain geographical and meteorological conditions was greater than had been anticipated, and such situations must be given special consideration in planning control measures.

It is obvious that under existing conditions certain measures of retrenchment are necessary. During the fall the blister rust staff and certain Forest Service personnel helped to classify the lands within the control boundaries. Standards were set up to indicate feasibility of control, the potential timber-producing capacity of the land, present status of the stand in regard to presence of ribes, rust and probable damage to the stand. Thus, the component parts of the control area were catalogued. The most productive young stands were selected as areas of high priority. Areas which could be temporarily deferred from working were so classified. Stands which could not be afforded protection at a reasonable cost, which were too badly infected or lacked the desired white pine producing capacity were dropped from future consideration. With the proper classifications setup it will be possible to better establish working priorities and plan long range control programs on the lands most suitable for white pine production.

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS IN INLAND EMPIRE, 1943

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 32,936.11
	Regular BLR-3-4	102,268.99
	Subtotal	$135,205.10
State of Idaho Timber Protective Associations	State BLR-3-4	12,252.13
	Private BLR-3-4	386.68
	Subtotal	$ 12,638.81
Forest Service	Regular BLR-4	$435,489.93
Total		$583,333.84

TABLE 2

CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1943

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal.perm.men	$27,750.96			$ 27,750.96	$ 28,649.43	$ 56,400.39
Sal.temp.men	1,499.67	$ 18,597.08	$ 1,975.67	22,072.42	33,216.93	55,289.35
Wages,temp.labs.		66,335.85	8,993.88	75,329.73	277,256.23	352,585.96
Subs. sup.	140.20	14,917.57	1,669.26	16,727.03	68,219.48	84,946.51
Equipment	141.21	52.50		193.71	14,582.92	14,776.63
Travel&trans.	1,413.48	1,070.02		2,483.50	7,842.41	10,325.91
Chemicals						
Twine					172.80	172.80
Other sup.	1,990.59	1,295.97		3,286.56	5,549.73	8,836.29
Total	$32,936.11	$102,268.99	$12,638.81	$147,843.91	$435,489.93	$583,333.84

	Bureau	Forest Service
Pounds of twine used	2,361	5,242
Pounds of chemical used	3,056	14,720

SUMMARY OF RIBES ERADICATION, 1943
INLAND EMPIRE

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Total Gallons Spray
Cutover (1940-1943)	552	1,416		1,968	2,811	833,928	
Cutover (Prior 1940)	985	4,993	2,284	8,262	8,242	622,870	
Burn (Prior 1940)		90	184	274	296	23,161	
Reproduction	5,006	7,871	4,539	17,416	23,559	1,646,450	
Pole	677	1,828	2,102	4,607	3,358	84,691	
Mature	158	369	74	601	351	9,537	
Brush	789	77	13	879	108	14,243	
All Upland	8,167	16,644	9,196	34,007	38,725	3,234,880	
Stream (Hand)	458	652	817	1,927	5,150	326,716	
Stream (Chemical)	208	60	325	593	882	39,249	13,483
All Stream	458	652	817	1,927	6,032	365,965	
All Types	8,625	17,296	10,013	35,934	44,757	3,600,845	

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man-Days	Ribes	Gallons Spray
Cutover (1940-1943)	552	1,018	437,240		1.84	792	
Cutover (Prior 1940)	985	762	138,580		.77	141	
Reproduction	5,006	7,656	750,999		1.53	150	
Pole	677	128	3,557		.19	5	
Mature	158	40	1,568		.25	10	
Brush	789	31	590		.04	1	
All Upland	8,167	9,635	1,332,534		1.18	163	
Stream (Hand)	458	2,027	185,085		4.43	404	
Stream (Chemical)	208	409	18,678	6,226	1.97	90	30
All Stream	458	2,436	203,763		5.32	445	
All Types	8,625	12,071	1,536,297		1.40	178	
TABLE 3B - SECOND WORKING							
Cutover (1940-1943)	1,416	1,793	396,688		1.27	280	
Cutover (Prior 1940)	4,993	4,975	304,785		1.00	61	
Burn (Prior 1940)	90	29	3,313		.32	37	
Reproduction	7,871	8,471	537,155		1.08	68	
Pole	1,828	1,893	39,497		1.04	22	
Mature	369	224	7,271		.61	20	
Brush	77	66	12,229		.86	159	
All Upland	16,644	17,451	1,300,938		1.05	78	
Stream (Hand)	652	1,154	45,579		1.77	70	
Stream (Chemical)	60	46	2,700	900	.77	45	15
All Stream	652	1,200	48,279		1.84	74	
All Types	17,296	18,651	1,349,217		1.08	78	
TABLE 3C - THIRD WORKING							
Cutover (Prior 1940)	2,284	2,505	179,505		1.10	79	
Burn (Prior 1940)	184	267	19,848		1.45	108	
Reproduction	4,539	7,432	358,296		1.64	79	
Pole	2,102	1,337	41,637		.64	20	
Mature	74	87	698		1.18	9	
Brush	13	11	1,424		.85	110	
All Upland	9,196	11,639	601,408		1.27	65	
Stream (Hand)	817	1,969	96,052		2.41	118	
Stream (Chemical)	325	427	17,871	6,357	1.31	55	20
All Stream	817	2,395	113,923		2.93	139	
All Types	10,013	14,035	715,331		1.40	71	

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943
INLAND EMPIRE

State	Working	Class	Acres	Effective Man-Days	Ribes	Gallons Spray	Per Acre Basis Man-Days	Per Acre Basis Ribes
Idaho	First	EQ-Coop.	985	762	138,580		.77	141
		FS-Reg.	4,629	8,411	936,632	6,226	1.82	202
		Total	5,614	9,173	1,075,212	6,226	1.63	192
	Second	EQ-Coop.	6,329	7,234	709,016		1.14	112
		FS-Reg.	7,642	8,362	404,673	900	1.09	53
		Total	13,971	15,596	1,113,689	900	1.12	80
	Third	EQ-Coop.	2,880	3,428	215,051	2,445	1.19	75
		FS-Reg.	5,625	9,352	369,141	3,912	1.66	66
		Total	8,505	12,780	584,192	6,357	1.50	69
	All Workings	EQ-Coop.	10,194	11,424	1,062,647	2,445	1.12	104
		FS-Reg.	17,896	26,125	1,710,446	11,038	1.46	96
		Total	28,090	37,549	2,773,093	13,483	1.34	99
Washington	First	FS-Reg.	268	539	164,216		2.01	613
	Second	FS-Reg	2,623	1,832	197,734		.70	75
	Third	FS-Reg.	1,119	1,118	126,435		1.00	113
	All Workings	FS-Reg.	4,010	3,489	488,385		.87	122
Montana	First	FS-Reg.	2,743	2,359	296,869		.86	108
	Second	FS-Reg.	702	1,223	37,794		1.74	54
	Third	FS-Reg.	389	137	4,704		.35	12
	All Workings	FS-Reg.	3,834	3,719	339,367		.97	89
Total	First	EQ-Coop.	985	762	138,580		.77	141
		FS-Reg.	7,640	11,309	1,397,717	6,226	1.48	183
		Total	8,625	12,071	1,536,297	6,226	1.40	178
	Second	EQ-Coop.	6,329	7,234	709,016		1.14	112
		FS-Reg.	10,967	11,417	640,201	900	1.04	58
		Total	17,296	18,651	1,349,217	900	1.08	78
	Third	EQ-Coop.	2,880	3,428	215,051	2,445	1.19	75
		FS-Reg.	7,133	10,607	500,280	3,912	1.49	70
		Total	10,013	14,035	715,331	6,357	1.40	71
	All Workings	EQ-Coop.	10,194	11,424	1,062,647	2,445	1.12	104
		FS-Reg.	25,740	33,333	2,538,198	11,038	1.29	99
		Total	35,934	44,757	3,600,845		1.25	100

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943
INLAND EMPIRE

State	Working	Number of Acres Worked: By Forest Service — National Forest	Public Domain	State	Private	Total	By Bureau of Entomology and Plant Quarantine — National Forest	State	Private	Total	Total — Federal — National Forest	Public Domain	Total	Other — State	Private	Total
Idaho	First	4,035	160	40	394	4,629		80	905	985	4,035	160	4,195	120	1,299	1,419
	Second	6,637	270	348	387	7,642	645	1,665	4,019	6,329	7,282	270	7,552	2,013	4,406	6,419
	Third	3,442	837		1,346	5,625	45	1,024	1,811	2,880	3,487	837	4,324	1,024	3,157	4,181
	Total	14,114	1,267	388	2,127	17,896	690	2,769	6,735	10,194	14,804	1,267	16,071	3,157	8,862	12,019
Washington	First	268				268					268		268			
	Second	2,623				2,623					2,623		2,623			
	Third	1,119				1,119					1,119		1,119			
	Total	4,010				4,010					4,010		4,010			
Montana	First	2,487			256	2,743					2,487		2,487		256	256
	Second	531			171	702					531		531		171	171
	Third	389				389					389		389			
	Total	3,407			427	3,834					3,407		3,407		427	427
Total	First	6,790	160	40	650	7,640		80	905	985	6,790	160	6,950	120	1,555	1,675
	Second	9,791	270	348	558	10,967	645	1,665	4,019	6,329	10,436	270	10,706	2,013	4,577	6,590
	Third	4,950	837		1,346	7,133	45	1,024	1,811	2,880	4,995	837	5,832	1,024	3,157	4,181
	Total	21,531	1,267	388	2,554	25,740	690	2,769	6,735	10,194	22,221	1,267	23,488	3,157	9,289	12,446

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943
INLAND EMPIRE

State	Working	Class	Acres	Effective Man-Days	Ribes	Gallons Spray	Per Acre Basis Man-Days	Per Acre Basis Ribes
Idaho	First	EQ-Coop.	985	762	138,580		.77	141
		FS-Reg.	4,629	8,411	936,632	6,226	1.82	202
		Total	5,614	9,173	1,075,212	6,226	1.63	192
	Second	EQ-Coop.	6,329	7,234	709,016		1.14	112
		FS-Reg.	7,642	8,362	404,673	900	1.09	53
		Total	13,971	15,596	1,113,689	900	1.12	80
	Third	EQ-Coop.	2,880	3,428	215,051	2,445	1.19	75
		FS-Reg.	5,625	9,352	369,141	3,912	1.66	66
		Total	8,505	12,780	584,192	6,357	1.50	69
	All Workings	EQ-Coop.	10,194	11,424	1,062,647	2,445	1.12	104
		FS-Reg.	17,896	26,125	1,710,446	11,038	1.46	96
		Total	28,090	37,549	2,773,093	13,483	1.34	99
Washington	First	FS-Reg.	268	539	164,216		2.01	613
	Second	FS-Reg	2,623	1,832	197,734		.70	75
	Third	FS-Reg.	1,119	1,118	126,435		1.00	113
	All Workings	FS-Reg.	4,010	3,489	488,385		.87	122
Montana	First	FS-Reg.	2,743	2,359	296,869		.86	108
	Second	FS-Reg.	702	1,223	37,794		1.74	54
	Third	FS-Reg.	389	137	4,704		.35	12
	All Workings	FS-Reg.	3,834	3,719	339,367		.97	89
Total	First	EQ-Coop.	985	762	138,580		.77	141
		FS-Reg.	7,640	11,309	1,397,717	6,226	1.48	183
		Total	8,625	12,071	1,536,237	6,226	1.40	178
	Second	EQ-Coop.	6,329	7,234	709,016		1.14	112
		FS-Reg.	10,967	11,417	640,201	900	1.04	58
		Total	17,296	18,651	1,349,217	900	1.08	78
	Third	EQ-Coop.	2,880	3,428	215,051	2,445	1.19	75
		FS-Reg.	7,133	10,607	500,280	3,912	1.49	70
		Total	10,013	14,035	715,331	6,357	1.40	71
	All Workings	EQ-Coop.	10,194	11,424	1,062,647	2,445	1.12	104
		FS-Reg.	25,740	33,933	2,538,198	11,038	1.29	99
		Total	35,934	44,757	3,600,845	13,483	1.25	100

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943
INLAND EMPIRE

State	Working	Number of Acres Worked															
		By Forest Service					By Bureau of Entomology and Plant Quarantine				Total						
											Federal			Other			
		National Forest	Public Domain	State	Private	Total	National Forest	State	Private	Total	National Forest	Public Domain	Total	State	Private	Total	Total
Idaho	First	4,035	160	40	394	4,629		80	905	985	4,035	160	4,195	120	1,299	1,419	5,614
	Second	6,637	270	348	387	7,642	645	1,665	4,019	6,329	7,282	270	7,552	2,013	4,406	6,419	13,971
	Third	3,442	837		1,346	5,625	45	1,024	1,811	2,880	3,487	837	4,324	1,024	3,157	4,181	8,505
	Total	14,114	1,267	388	2,127	17,896	690	2,769	6,735	10,194	14,804	1,267	16,071	3,157	8,862	12,019	28,090
Washington	First	268				268					268		268				268
	Second	2,623				2,623					2,623		2,623				2,623
	Third	1,119				1,119					1,119		1,119				1,119
	Total	4,010				4,010					4,010		4,010				4,010
Montana	First	2,487			256	2,743					2,487		2,487		256	256	2,743
	Second	531			171	702					531		531		171	171	702
	Third	389				389					389		389				389
	Total	3,407			427	3,834					3,407		3,407		427	427	3,834
Total	First	6,740	160	40	650	7,640		80	905	985	6,790	160	6,950	120	1,555	1,675	8,625
	Second	9,791	270	348	558	10,967	645	1,665	4,019	6,329	10,436	270	10,706	2,013	4,577	6,590	17,296
	Third	4,950	837		1,346	7,133	45	1,024	1,811	2,880	4,995	837	5,832	1,024	3,157	4,181	10,013
	Total	21,531	1,267	388	2,554	25,740	690	2,769	6,735	10,194	22,221	1,267	23,488	3,157	9,288	12,446	35,934

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	
First	Cutover (1940-1943)	552	24,123	413,117			437,240
	Cutover (Prior 1940)	985	89,774	48,680	126		138,580
	Reproduction	5,006	450,688	296,697		3,614	750,999
	Pole	677	959	2,598			3,557
	Mature	158	1,178	292		98	1,568
	Brush	789	210	380			590
	All Upland	8,167	566,932	761,764	126	3,712	1,332,534
	Stream	458	166,922	517	18,678	17,646	203,763
	All Types	8,625	733,854	762,281	18,804	21,358	1,536,297
Second	Cutover (1940-1943)	1,416	37,258	347,798	11,632		396,688
	Cutover (Prior 1940)	4,993	108,746	190,370	2,048	3,621	304,785
	Burn (Prior 1940)	90	459	2,854			3,313
	Reproduction	7,871	255,711	275,014		6,430	537,155
	Pole	1,828	10,678	28,819			39,497
	Mature	369	6,624	647			7,271
	Brush	77	582	11,647			12,229
	All Upland	16,644	420,058	857,149	13,680	10,051	1,300,938
	Stream	652	42,988	2,035	2,700	556	48,279
	All Types	17,296	463,046	859,184	16,380	10,607	1,349,217
Third	Cutover (Prior 1940)	2,284	73,962	98,633	6,910		179,505
	Burn (Prior 1940)	184	18,806	1,042			19,848
	Reproduction	4,539	125,799	232,435	62		358,296
	Pole	2,102	37,733	3,829		75	41,637
	Mature	74	493	205			698
	Brush	13	129	1,295			1,424
	All Upland	9,196	256,922	337,439	6,972	75	601,408
	Stream	817	82,178	580	22,068	9,097	113,923
	All Types	10,013	339,100	338,019	29,040	9,172	715,331
All Workings	Cutover (1940-1943)	1,968	61,381	760,915	11,632		833,928
	Cutover (Prior 1940)	8,262	272,482	337,683	9,084	3,621	622,870
	Burn (Prior 1940)	274	19,265	3,896			23,161
	Reproduction	17,416	832,198	804,146	62	10,044	1,646,450
	Pole	4,607	49,370	35,246		75	84,691
	Mature	601	8,295	1,144		98	9,537
	Brush	879	921	13,322			14,243
	All Upland	34,007	1,243,912	1,956,352	20,778	13,838	3,234,880
	Stream	1,927	292,088	3,132	43,446	27,299	365,965
	All Types	35,934	1,536,000	1,959,484	64,224	41,137	3,600,845

SUMMARY OF RIBES ERADICATION, 1923-1943
INLAND EMPIRE

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1943)	552	1,627	54	2,233	3,000	847,930	
Burn (1940-1943)		60		60	232	134,749	
Cutover (Prior 1940)	50,524	53,641	15,736	119,901	129,728	34,168,710	
Burn (Prior 1940)	8,181	1,703	184	10,068	11,066	3,865,980	
Reproduction	594,598	165,779	27,409	787,786	897,350	204,409,902	
Pole	356,741	78,204	7,455	442,400	201,978	32,654,090	
Mature	722,555	44,430	2,332	769,317	337,966	70,973,177	
Brush	25,830	2,431	472	28,733	27,188	5,120,191	
Subalpine	3,255	291	88	3,634	2,363	491,592	
Meadow-Field	2,569	10		2,579	152	12,203	
All Upland	1,764,805	348,176	53,730	2,166,711	1,610,923	352,678,524	
Stream (Hand)	119,245	47,736	13,653	180,634	301,692	69,658,030	
Stream (Chemical)	23,124	9,298	1,574	33,996	69,539	5,475,332	1,794,639
Stream (Mechanical)	3,728	155	40	3,923	32,288	2,231,390	
Stream (Zone)	372	4,476		4,848	4,954	626,262	
All Stream	123,345	52,367	13,693	189,405	408,473	77,991,014	
All Types	1,888,150	400,543	67,423	2,356,116	2,019,396	430,669,538	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days	Ribes	Gallons Spray
Cutover (1940-1943)	552	1,018	437,240		1.84	792	
Cutover (Prior 1940)	50,524	49,331	16,954,236		.98	336	
Burn (Prior 1940)	8,181	7,156	2,894,183		.87	354	
Reproduction	594,598	663,862	180,806,528		1.12	304	
Pole	356,741	151,436	27,833,255		.42	78	
Mature	722,555	307,814	67,219,075		.43	93	
Brush	25,830	24,596	4,857,422		.95	188	
Subalpine	3,255	2,170	463,787		.67	142	
Meadow-Field	2,569	151	12,131		.06	5	
All Upland	1,764,806	1,207,534	301,477,857		.68	171	
Stream (Hand)	119,245	221,483	57,166,754		1.86	479	
Stream (Chemical)	23,124	54,795	4,657,968	1,521,721	2.37	201	66
Stream (Mechanical)	3,728	30,392	2,147,593		8.15	576	
Stream (Zone)	372	1,315	141,227		3.53	380	
All Stream	123,345	307,985	64,113,542		2.50	520	
All Types	1,888,150	1,515,519	365,591,399		.80	194	

TABLE 7B - SECOND WORKING

Cutover (1940-1943)	1,627	1,940	402,879		1.19	248	
Burn (1940-1943)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	53,641	61,243	15,413,877		1.14	287	
Burn (Prior 1940)	1,703	3,643	951,949		2.14	559	
Reproduction	165,779	196,590	21,062,659		1.19	127	
Pole	78,204	45,381	4,399,816		.58	56	
Mature	44,430	28,533	3,549,564		.64	80	
Brush	2,431	2,292	240,671		.94	99	
Subalpine	291	154	22,457		.53	77	
Meadow-Field	10	1	72		.10	7	
All Upland	348,176	340,209	45,178,693		.98	133	
Stream (Hand)	47,736	62,919	10,362,907		1.32	217	
Stream (Chemical)	9,298	13,252	728,192	242,794	1.43	78	14
Stream (Mechanical)	155	1,254	63,794		8.09	412	
Stream (Zone)	4,476	3,639	485,036		.81	108	
All Stream	52,367	81,064	11,639,828		1.55	222	
All Types	400,543	421,273	57,818,521		1.05	144	

TABLE 7C - THIRD WORKING

Cutover (1940-1943)	54	42	7,811		.78	145	
Cutover (Prior 1940)	15,736	19,154	1,800,597		1.22	114	
Burn (Prior 1940)	184	267	19,848		1.45	108	
Reproduction	27,409	36,798	2,540,715		1.34	93	
Pole	7,455	4,961	421,019		.67	56	
Mature	2,332	1,619	204,538		.69	88	
Brush	472	300	22,098		.64	47	
Subalpine	88	39	5,349		.44	61	
All Upland	53,730	63,180	5,021,974		1.18	93	
Stream (Hand)	13,653	17,290	2,128,472		1.27	156	
Stream (Chemical)	1,574	1,492	89,172	30,124	.95	57	19
Stream (Mechanical)	40		20,000		16.05	500	
All Stream	13,693	19,424	2,237,644		1.42	163	
All Types	67,423	82,604	7,259,618		1.23	108	

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1943
INLAND EMPIRE

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days	Per Acre Basis Ribes
Idaho	First	EQ-Reg.	48,984	20,468	5,042,300	79,864	.42	103
		EQ-Coop.	153,482	62,562	16,793,774	175,584	.41	109
		EQ-Emerg.	397,953	290,528	77,495,446	152,489	.73	195
		FS-Reg.	220,590	221,461	59,022,155	392,031	1.00	268
		FS-Emerg.	305,020	194,845	54,142,291	113,170	.64	178
		CCC	517,106	540,911	109,366,841	550,758	1.05	211
		Total	1,643,135	1,330,775	321,862,807	1,463,896	.81	196
	Second	EQ-Coop.	28,160	22,544	2,258,488	11,078	.80	80
		EQ-Emerg.	104,562	98,803	17,869,385	56,311	.94	171
		FS-Reg.	133,580	136,350	16,279,371	52,671	1.02	122
		FS-Emerg.	31,164	20,079	2,298,185	10,051	.64	74
		CCC	65,117	106,410	13,052,710	101,537	1.63	200
		Total	362,583	384,186	51,758,139	231,648	1.06	143
	Third	EQ-Coop.	8,824	9,397	820,822	2,445	1.06	93
		EQ-Emerg.	12,427	14,769	1,509,738	5,135	1.19	121
		FS-Reg.	26,245	33,668	2,232,860	11,721	1.28	85
		FS-Emerg.	1,685	1,316	196,299	2,270	.78	116
		CCC	8,191	14,372	1,309,689	5,008	1.75	160
		Total	57,372	73,522	6,069,408	26,579	1.28	106
	All Workings	EQ-Reg.	48,984	20,468	5,042,300	79,864	.42	103
		EQ-Coop.	190,466	94,503	19,873,084	189,107	.50	104
		EQ-Emerg.	514,942	404,100	96,874,569	213,935	.78	188
		FS-Reg.	380,415	391,479	77,534,386	456,423	1.03	204
		FS-Emerg.	337,869	216,240	56,636,775	125,491	.64	168
		CCC	590,414	661,693	123,729,240	657,303	1.12	210
		Total	2,063,090	1,788,483	379,690,354	1,722,123	.87	184
Washington	First	EQ-Emerg.	48,156	46,892	14,422,701		.97	299
		FS-Reg.	14,219	14,129	5,540,841		.99	390
		FS-Emerg.	34,417	12,708	3,858,496		.37	112
		CCC	19,741	21,426	3,254,404		1.09	165
		Total	116,533	95,155	27,076,442		.82	232
	Second	EQ-Emerg.	11,920	12,212	2,634,166		1.02	221
		FS-Reg.	11,503	6,810	1,589,014		.59	138
		FS-Emerg.	1,949	1,678	154,764		.86	79
		CCC	2,587	3,279	232,829		1.27	90
		Total	27,959	23,979	4,610,773		.86	165
	Third	EQ-Emerg.	4,681	4,036	768,915		.86	164
		FS-Reg.	1,752	1,334	201,700		.76	115
		Total	6,433	5,370	970,615		.83	151
	All Workings	EQ-Emerg.	64,757	63,140	17,825,782		.98	275
		FS-Reg.	27,474	22,273	7,331,555		.81	267
		FS-Emerg.	36,366	14,386	4,013,260		.40	110
		CCC	22,328	24,705	3,487,233		1.11	156
		Total	150,925	124,504	32,657,830		.82	216
Montana	First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334
		EQ-Emerg.	64,086	28,413	5,450,738	1,330	.44	85
		FS-Reg.	15,779	15,690	2,284,611	2,452	.99	145
		FS-Emerg.	33,462	33,088	7,157,633	20,598	.99	214
		CCC	13,772	10,083	1,296,868	2,780	.73	94
		Total	128,482	89,589	16,652,150	57,825	.70	130
	Second	EQ-Reg.	619	980	299,410	4,130	1.58	484
		EQ-Emerg.	1,342	1,597	265,637		1.19	198
		FS-Reg.	5,262	5,893	517,114	5,976	1.12	98
		FS-Emerg.	2,100	2,464	204,021	1,040	1.17	97
		CCC	678	2,174	163,427		3.21	241
		Total	10,001	13,108	1,449,609	11,146	1.31	145
	Third	EQ-Emerg.	648	777	59,040		1.20	91
		FS-Reg.	2,795	2,684	142,772		.96	51
		FS-Emerg.	150	68	6,069		.45	40
		CCC	25	183	11,714	3,545	7.32	469
		Total	3,618	3,712	219,595	3,545	1.03	61
	All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
		EQ-Emerg.	66,076	30,787	5,775,415	1,330	.47	87
		FS-Reg.	23,836	24,267	2,944,497	8,428	1.02	124
		FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206
		CCC	14,475	12,440	1,472,009	6,325	.86	102
		Total	142,101	106,409	18,321,354	72,516	.75	129
Idaho Washington Montana	First	EQ-Reg.	50,367	22,783	5,504,600	110,529	.45	109
		EQ-Coop.	153,482	62,562	16,793,774	175,584	.41	109
		EQ-Emerg.	510,195	365,833	97,368,885	153,819	.72	191
		FS-Reg.	250,588	251,280	66,847,607	394,483	1.00	267
		FS-Emerg.	372,899	240,641	65,158,420	133,768	.65	175
		CCC	550,619	572,420	113,918,113	553,538	1.04	207
		Total	1,888,150	1,515,519	365,591,399	1,521,721	.80	194
	Second	EQ-Reg.	619	980	299,410	4,130	1.58	484
		EQ-Coop.	28,160	22,544	2,258,488	11,078	.80	80
		EQ-Emerg.	117,824	112,612	20,769,188	56,311	.96	176
		FS-Reg.	150,345	149,053	18,385,499	58,647	.99	122
		FS-Emerg.	35,213	24,221	2,656,970	11,091	.69	75
		CCC	69,392	111,863	13,448,966	101,537	1.64	197
		Total	400,543	421,273	57,818,521	242,794	1.05	144
	Third	EQ-Coop.	8,824	9,397	820,822	2,445	1.06	93
		EQ-Emerg.	17,756	19,582	2,337,693	5,135	1.10	132
		FS-Reg.	30,792	37,686	2,577,332	11,721	1.22	84
		FS-Emerg.	1,835	1,384	202,368	2,270	.75	110
		CCC	8,216	14,555	1,321,403	8,553	1.77	161
		Total	67,423	82,604	7,259,618	30,124	1.23	108
	All Workings	EQ-Reg.	50,986	23,763	5,804,010	114,659	.47	114
		EQ-Coop.	190,466	94,503	19,873,084	189,107	.50	104
		EQ-Emerg.	645,775	498,027	120,475,766	215,265	.77	187
		FS-Reg.	431,725	438,019	87,810,438	464,851	1.01	203
		FS-Emerg.	409,947	266,246	68,017,758	147,129	.65	166
		CCC	627,217	698,838	128,688,482	663,628	1.11	205
		Total	2,356,116	2,019,396	430,669,538	1,794,639	.86	183

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1943
INLAND EMPIRE

State	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	871,361	16,642	888,003	264,138	490,994	755,132	1,643,135
	Second	203,626	5,840	209,466	50,110	103,007	153,117	362,583
	Third	27,135	1,039	28,174	8,892	20,306	29,198	57,372
	Total	1,102,122	23,521	1,125,643	323,140	614,307	937,447	2,063,090
Washington	First	69,708	315	70,023	6,832	39,678	46,510	116,533
	Second	16,371	60	16,431	3,935	7,593	11,528	27,959
	Third	1,752		1,752	2,114	2,567	4,681	6,433
	Total	87,831	375	88,206	12,881	49,838	62,719	150,925
Montana	First	108,715	40	108,755	734	18,993	19,727	128,482
	Second	7,944		7,944	1	2,056	2,057	10,001
	Third	2,244		2,244		1,374	1,374	3,618
	Total	118,903	40	118,943	735	22,423	23,158	142,101
Total	First	1,049,784	16,997	1,066,781	271,704	549,665	821,369	1,888,150
	Second	227,941	5,900	233,841	54,046	112,656	166,702	400,543
	Third	31,131	1,039	32,170	11,006	24,247	35,253	67,423
	Total	1,308,856	23,936	1,332,792	336,756	686,568	1,023,324	2,356,116

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1943
INLAND EMPIRE

State	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	National Forest	871,361	202,275	1,073,636	56,454	1,130,090
	Public Domain	16,642	13,908	30,550	1,040	31,590
	Subtotal Federal	888,003	216,183	1,104,186	57,494	1,161,680
	State	264,138	48,782	312,920	32,030	344,950
	Private	490,994	215,004	705,998	95,027	801,025
	Subtotal Other	755,132	263,786	1,018,918	127,057	1,145,975
	Total	1,643,135	479,969	2,123,104	184,551	2,307,655
Washington	National Forest	69,708	29,602	99,310		99,310
	Public Domain	315		315		315
	Subtotal Federal	70,023	29,602	99,625		99,625
	State	6,832	3,018	9,850		9,850
	Private	39,678	11,942	51,620		51,620
	Subtotal Other	46,510	14,960	61,470		61,470
	Total	116,533	44,562	161,095		161,095
Montana	National Forest	108,715	37,700	146,415	17,468	163,883
	Public Domain	40		40		40
	Subtotal Federal	108,755	37,700	146,455	17,468	163,923
	State	734	234	968		968
	Private	18,993	14,366	33,359	2,490	35,849
	Subtotal Other	19,727	14,600	34,327	2,490	36,817
	Total	128,482	52,300	180,782	19,958	200,740
Total	National Forest	1,049,784	269,577	1,319,361	73,922	1,393,283
	Public Domain	16,997	13,908	30,905	1,040	31,945
	Subtotal Federal	1,066,781	283,485	1,350,266	74,962	1,425,228
	State	271,704	52,034	323,738	32,030	355,768
	Private	549,665	241,312	790,977	97,517	888,494
	Subtotal Other	821,369	293,346	1,114,715	129,547	1,244,262
	Total	1,888,150	576,831	2,464,981	204,509	2,669,490

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1943
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	Ribes acerifolium	Total Ribes
First	Cutover (1940-1943)	552	24,123	413,117							437,240
	Cutover (Prior 1940)	50,524	6,001,138	10,779,971	43,999	90,333	38,795				16,954,236
	Burn (Prior 1940)	8,181	789,491	2,077,346	568	17,486	9,292				2,894,183
	Reproduction	594,598	50,194,306	128,705,363	204,815	1,192,865	504,579	3,455	1,145		180,806,528
	Pole	356,741	14,202,253	12,941,960	65,233	385,968	233,465		462	3,914	27,833,255
	Mature	722,555	43,888,095	22,214,062	226,309	405,482	475,817	7,257	26	2,027	67,219,075
	Brush	25,830	1,523,204	3,197,010	19,257	97,116	20,835				4,857,422
	Subalpine	3,255	326,851	136,917		19					463,787
	Meadow-Field	2,569	5,010			7,121					12,131
	All Upland	1,764,805	116,954,471	180,465,746	560,181	2,196,390	1,282,783	10,712	1,633	5,941	301,477,857
	Stream	123,345	42,452,055	2,007,345	6,394,967	13,070,211	116,220	31,905	21,255	19,584	64,113,542
	All Types	1,888,150	159,406,526	182,473,091	6,955,148	15,266,601	1,399,003	42,617	22,888	25,525	365,591,399
Second	Cutover (1940-1943)	1,627	41,347	349,900	11,632						402,879
	Burn (1940-1943)	60	32,168	102,581							134,749
	Cutover (Prior 1940)	53,641	3,694,312	11,595,676	80,383	28,350	15,156				15,413,877
	Burn (Prior 1940)	1,703	430,930	515,572	5,447						951,949
	Reproduction	165,779	7,512,375	13,352,882	51,975	111,721	31,115		2,591		21,062,659
	Pole	78,204	2,237,746	2,094,594	25,808	39,928	1,740				4,399,816
	Mature	44,430	1,928,595	1,552,899	16,546	15,098	36,159		267		3,549,564
	Brush	2,431	69,685	170,111		875					240,671
	Subalpine	291	13,555	8,902							22,457
	Meadow-Field	10	72								72
	All Upland	348,176	15,960,785	29,743,117	191,791	195,972	84,170		2,858		46,178,693
	Stream	52,367	6,743,588	782,616	1,956,566	1,968,887	32,190		155,981		11,639,828
	All Types	400,543	22,704,373	30,525,733	2,148,357	2,164,859	116,360		158,839		57,818,521
Third	Cutover (1940-1943)	54	6,219	1,592							7,811
	Cutover (Prior 1940)	15,736	779,321	986,575	26,736	7,822	143				1,800,597
	Burn (Prior 1940)	184	18,806	1,042							19,848
	Reproduction	27,409	1,027,522	1,493,858	8,448	10,559	214		114		2,540,715
	Pole	7,455	240,750	179,952	42	269	6				421,019
	Mature	2,332	149,936	52,866	8		1,728				204,538
	Brush	472	6,149	15,925		24					22,098
	Subalpine	88	2,510	2,838							5,348
	All Upland	53,730	2,231,213	2,734,648	35,234	18,674	2,091		114		5,021,974
	Stream	13,693	1,115,149	31,696	578,829	493,846			18,124		2,237,644
	All Types	67,423	3,346,362	2,766,344	614,063	512,520	2,091		18,238		7,259,618
All Workings	Cutover (1940-1943)	2,233	71,689	764,609	11,632						847,930
	Burn (1940-1943)	60	32,168	102,581							134,749
	Cutover (Prior 1940)	119,901	10,474,771	23,362,222	151,118	126,505	54,094				34,168,710
	Burn (Prior 1940)	10,068	1,239,227	2,593,960	6,015	17,486	9,292				3,865,980
	Reproduction	787,786	58,734,203	143,552,103	265,238	1,315,145	535,908	3,455	3,850		204,409,902
	Pole	442,400	16,680,749	15,216,506	91,083	426,165	235,211		462	3,914	32,654,090
	Mature	769,317	45,966,626	23,819,827	242,863	420,580	513,704	7,257	293	2,027	70,973,177
	Brush	28,733	1,599,038	3,383,046	19,257	98,015	20,835				5,120,191
	Subalpine	3,634	342,916	148,657		19					491,592
	Meadow-Field	2,579	5,082			7,121					12,203
	All Upland	2,166,711	135,146,469	212,943,511	787,206	2,411,036	1,369,044	10,712	4,605	5,941	352,678,524
	Stream	189,405	50,310,792	2,821,657	8,930,362	15,532,944	148,410	31,905	195,360	19,584	77,991,014
	All Types	2,356,116	185,457,261	215,765,168	9,717,568	17,943,980	1,517,454	42,617	199,965	25,525	430,669,538

BLISTER RUST CONTROL WORK, CLEARWATER OPERATION, 1943

By
H. J. Faulkner, Technical Supervisor
David Kyle, Forester, U. S. Forest Service

INTRODUCTION

The combined blister rust control program of the Forest Service and the Bureau of Entomology and Plant Quarantine was smaller than the 1942 operation although there was a small increase in the number of workers employed by the Bureau of Entomology and Plant Quarantine.

The season was characterized by the employment of the youngest workers in the history of blister rust control and a shortage of experienced overhead and skilled workers of all kinds.

Homesickness, unfamiliarity with camp life and forest work, and attractive jobs in private industry caused a considerable turnover in workers throughout the season and an early closing of camps when weather conditions were ideal for eradication work. Handling of teen-age boys under 18 years old in groups, without the steadying influence of older boys and men and without adequate supervision of older and experienced workers presented a difficult problem. However, as the season progressed and crews gained experience in eradication work, good results were obtained. The large number of extremely young boys given training and experience this year should furnish a good nucleus of experienced workers for next season and for many years to come.

The effective season was very short due to a late spring and the workers leaving the job during August to return to school. It was July 1 before all camps were in operation, and by August 15 it was necessary to consolidate camps. All camps were closed on or before September 1.

During September and October the permanent Bureau and Forest Service blister rust control personnel, aided by two members of the Regional Blister Rust Control Office, covered a large portion of the control areas for the purpose of re-evaluation and classification of areas.

ORGANIZATION AND ADMINISTRATION

Blister rust control activities were handled in accordance with the memorandums of understanding between the Bureau of Entomology and Plant Quarantine and the Forest Service and between the Bureau and the State of Idaho and the Clearwater Timber Protective Association. On Forest Service lands control work was organized and administered under the District Rangers. Bureau personnel had charge of all work performed by cooperative camps on state and private lands.

The blister rust control field organization was as follows:

Bureau of Entomology and Plant Quarantine	U. S. Forest Service
Harry J. Faulkner, Technical Supervisor	David Kyle, Forest Officer
John C. Gonyou, Checker Foreman	Virgil J. Evans, Unit Supervisor

Program	Number Camps	Number Workers
EQ-Cooperative	3	140
FS-Regular	5	187
Total number employed on blister rust control		327

The field headquarters at Pierce, Idaho, was opened on May 4. This camp is maintained by the Bureau of Entomology and Plant Quarantine and serves as a supply and operating base for Bureau camps and also a work camp for a 25-man eradication crew. The Forest Service ranger station and central warehouse at Pierce, Idaho, served as an operating and supply base for all Forest Service camps.

The first camp was established on May 25 and the last on July 1. All camps were closed by September 1. The Forest Service experienced considerable difficulty and delay in establishing camps in the Moose City basin area on the Kelly Creek district due to the late spring and snow slides which blocked the North Fork of the Clearwater River Canyon road until late in June.

LOCATION AND DESCRIPTION OF AREAS

Areas worked by the Forest Service regular camps were located on Sourdough Creek in T. 40 N., R. 7 E., secs. 7 and 18 and the North Fork of the Clearwater River at the Bungalow Ranger Station in secs. 11, 12, 13 and 14. The remainder of the Forest Service camps were located in the Moose City basin area on the Kelly Creek district as follows: mouth of Ruby Creek, T. 39 N., R. 11 E., secs. 4, 8 and 9; Alma Mine on Osier Creek, T. 39 N., R. 11 E., secs. 16, 17, 20 and 21 and Cedars Ranger Station on the North Fork of the Clearwater River, T. 40 N., R. 11 E., secs. 21 and 28.

The Bungalow Ranger Station, Ruby Creek and Cedars Ranger Station camps performed first working in advanced reproduction stands on burned-over lands. Heavy ribes and very difficult working conditions were encountered on all areas. The Ruby and Cedars camps also did stream type, hand and chemical eradication on Independence Creek and the Clearwater River. The Alma Mine camp was engaged primarily in the chemical eradication of Ribes petiolare on Osier Creek and its tributaries. The Sourdough Creek camp worked entirely on recently cutover lands involving the eradication of large numbers of small ribes.

The work of the Bureau cooperative camps was again concentrated in the vicinity of Pierce and Headquarters, Idaho, on recently cutover lands. The camp areas were located as follows: Upper Reeds Creek, T. 38 N., R. 6 E., secs. 18, 19 and 30 and T. 38 N., R. 5 E., secs. 24, 25 and 36; Clearwater Timber Protective Association headquarters on Reeds Creek and Deer Creek in T. 38 N., R. 5 E., secs. 22, 23, 24, 26 and 27 and blister rust control headquarters near Pierce, Idaho, on a tributary of Orofino Creek in T. 36 N., R. 5 E., secs. 10, 11, 16, 20, 21 and 28.

METHODS AND EQUIPMENT

Standardized methods and equipment on both hand and chemical eradication were used through the operation. With inexperienced workers and limited supervision the working of from three to five 3-man crews in adjacent crew lanes under the supervision of a straw boss has proven to be the most satisfactory method for upland work. This method requires the laying of string lanes in advance of the crews.

SURVEYS AND STATUS OF CONTROL

Plans and procedures were set up during the previous winter for a complete re-evaluation and classification of the control area. The purposes are, first, to provide a complete record of information on individual areas essential in the over-all planning of control work and, second, to segregate the control area into classes to show areas warranting highest priority for protection, deferred areas and drop areas and to evaluate the white pine-producing qualities of work areas.

The first step in carrying out this plan was a review of the entire control unit for classification of areas where adequate information was already available. This was accomplished at a joint meeting of Forest Service and Bureau personnel held at field headquarters late in August.

The second step called for examination of those areas where up-to-date or adequate information was not available. Good progress was made on the field examinations during September and October, the major portion of the job being completed.

The small blocks of isolated control area on Minnesaka and Isabella Creek drainages and the narrow stringer along the North Fork of the Clearwater River extending from the Canyon Ranger Station to the Kelly Creek Ranger Station were eliminated from further consideration for control work. No work has been done on these areas, and the rust has become generally established. Eradication on these areas would be costly and difficult, and with the rust already present it would not be advisable to attempt control.

Advance pole stands on Eldorado, Lolo, Musselshell, French, Tamarack, Lodge and Tumble Creek drainages are generally high quality stands, and with the exception of stream type mop-up very little work will be necessary to protect them.

In general, reproduction and pole stands on the National Forest lands that have been worked are in good condition. Future work will be confined to stream type mop-up and reeradication on parts of the upland where surveys show additional work is necessary to place the areas on a maintenance basis.

White pine plantations on Sylvan, Alder and the head of Beaver Creek will receive first consideration for future control work on the National Forest. One or more workings have been done on these areas but complete protection has not been established. Due to the young age class of the pine they are extremely vulnerable to serious damage over a short period of time and from a few ribes.

Due to a shortage of qualified personnel, disease surveys and post check have lagged far behind the needs for disease and ribes information on many areas and should be given high priority when qualified men are again available for survey work.

On the Timber Protective Association lands, the protection of young reproduction stands on recently cutover areas is the major control problem. The present small control programs and accelerated cutting of white pine, due to increased demands for lumber brought about by the war, necessitate the selecting of only the better pine producing areas for protection. This is a difficult and complex problem due to the great variation in overwood densities, available seed source, site, methods of brush disposal and many other factors that influence the chances of establishing white pine following logging and protecting it from blister rust. If an area does not have an adequate seed source following cutting, the chances of establishing white pine are poor. Ribes and pine germinate at the same time and heavy infection may take place before the ribes can be removed. Working will be deferred on these areas under the present sized program.

First priority for working under the present program will be given to areas where reproduction is already established and partially protected by one or two workings.

The Scofield basin, comprising an area of approximately 4,500 acres of advance reproduction was found to be generally in fair condition considering that the upland has had only one working. Rust has spread generally over the area and some damage has occurred. A complete reworking of the stream type and a partial working of the upland will be necessary to protect the stand. This work should be completed as soon as possible.

A considerable acreage of white pine cutover lands, occurring along the western side of the control area and still supporting a heavy residual stand of other species, will be dropped from the control area or put in a deferred classification. This portion of the control area approaches the limits of the white pine belt, and the original stand contained a high percentage of species other than white pine. The removal of the white pine and cedar failed to open the canopy of these stands sufficiently to permit the reestablishment of white pine. This is generally true of Heywood, Grasshopper, Winter, Lower Orofino, Upper Silver, Elkberry and Beaver Creek drainages. These areas were dropped from further consideration for control work if no white pine seed source was present to restock the stands in the event the mixed species were harvested. Smaller blocks of heavy residual stands of mixed species occur through the entire cutover area.

Many of the cutover areas have been slow, or failed entirely, to restock to white pine due to a lack of white pine seed source. These areas will be held in a deferred status if there is a possibility of their becoming good white pine stands through natural seeding or planting. Where the growth of other species has eliminated the further establishment of white pine, they will be dropped from the control area.

CHECKING AND PINE DISEASE SURVEY

Checking was limited to sample and administrative checks by the eradication supervisor during the regular season. After the camps were closed a two per cent regular check was run on 3,145 acres of upland area by the eradication supervisor.

While no systematic disease surveys were run this season, an extensive sample of disease conditions was gained in conjunction with other fall surveys and through inspections by the overhead throughout the season. The results showed that a heavy wave of infection occurred in 1941 throughout the control area.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 7,001.97
	Regular BLR-3-4	39,814.54
	Subtotal	$ 46,816.51
State of Idaho Clearwater Timber Protective Association	State BLR-3-4	3,815.03
	Private BLR-3-4	386.68
	Subtotal	$ 4,201.71
Forest Service	Regular BLR-4	$ 71,902.85
Total		$122,921.07

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
CLEARWATER OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	$5,529.10			$ 5,529.10	$ 2,990.00	$ 8,519.10
Sal. temp. men	919.15	$ 6,235.09	$ 511.98	7,666.22	11,651.59	19,317.81
Wages, temp.labs.		26,774.33	3,115.66	29,889.99	38,687.36	68,577.35
Subs. supplies	47.24	6,067.19	574.07	6,688.50	13,425.08	20,113.58
Equipment	1.48	9.94		11.42	2,907.47	2,918.89
Travel & transp.	296.52	362.82		659.34	921.87	1,581.21
Other supplies	208.48	365.17		573.65	1,319.48	1,893.13
Total	$7,001.97	$39,814.54	$4,201.71	$51,018.22	$71,902.85	$122,921.07

SUMMARY OF RIBES ERADICATION, 1943
CLEARWATER OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
								Bushes	Live Stem
Cutover (1940-1943)	552	1,416		1,968	2,811	833,928		24.3	35.0
Cutover (Prior 1940)		936	1,940	2,876	2,879	266,909		11.9	11.4
Reproduction	450	316		766	2,650	152,595			
All Upland	1,002	2,668	1,940	5,610	8,340	1,253,432		16.7	20.4
Stream (Hand)	293	60	39	392	881	96,422			
Stream (Chemical)	208	60	39	307	647	27,513	9,571		
All Stream	293	60	39	392	1,528	123,935			
All Types	1,295	2,728	1,979	6,002	9,868	1,377,367		16.7	20.4

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
					Man-Days	Ribes	Gallons Spray	Bushes	Live Stem
Cutover (1940-1943)	552	1,018	437,240		1.84	792			
Reproduction	450	1,802	106,083		4.00	236			
All Upland	1,002	2,820	543,323		2.81	542			
Stream (Hand)	293	720	84,942		2.46	290			
Stream (Chemical)	208	409	18,678	6,226	1.97	90	30		
All Stream	293	1,129	103,620		3.85	354			
All Types	1,295	3,949	646,943		3.05	500			
TABLE 3B - SECOND WORKING									
Cutover (1940-1943)	1,416	1,793	396,688		1.27	280		24.3	35.0
Cutover (Prior 1940)	936	1,055	123,438		1.13	132		8.3	10.8
Reproduction	316	848	46,512		2.68	147			
All Upland	2,668	3,696	566,638		1.39	212		16.1	22.6
Stream (Hand)	60	99	5,439		1.65	91			
Stream (Chemical)	60	46	2,700	900	.77	45	15		
All Stream	60	145	8,139		2.42	136			
All Types	2,728	3,841	574,777		1.41	211		16.1	22.6
TABLE 3C - THIRD WORKING									
Cutover (Prior 1940)	1,940	1,824	143,471		.94	74		18.7	12.1
Stream (Hand)	39	62	6,041		1.59	155			
Stream (Chemical)	39	192	6,135	2,445	4.92	157	63		
All Stream	39	254	12,176		6.51	312			
All Types	1,979	2,078	155,647		1.05	79		18.7	12.1

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man-Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	FS-Reg.	1,295	3,949	646,943	6,226	3.05	500	30		
Second	EQ-Coop	2,352	2,848	520,126		1.21	221		16.1	22.6
	FS-Reg.	376	993	54,651	900	2.64	145	15		
	Total	2,728	3,841	574,777	900	1.41	211	15		
Third	EQ-Coop.	1,979	2,078	155,647	2,445	1.05	79	63	18.7	12.1
All Workings	EQ-Coop.	4,331	4,926	675,773	2,445	1.14	156	63	16.7	20.4
	FS-Reg.	1,671	4,942	701,594	7,126	2.96	420	27		
	Total	6,002	9,868	1,377,367	9,571	1.64	229	31	16.7	20.4

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943
CLEARWATER OPERATION

State	Working	Number of Acres Worked				
		By Forest Service	By Bureau of Entomology and Plant Quarantine			Total
		National Forest	State	Private	Total	
Idaho	First	1,295				1,295
	Second	376	392	1,960	2,352	2,728
	Third		168	1,811	1,979	1,979
	Total	1,671	560	3,771	4,331	6,002

Note: Only national forest worked by Forest Service, and only state and private worked by Bureau of Entomology and Plant Quarantine.

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Cutover (1940-1943)	552	24,123	413,117		437,240
	Reproduction	450	35,172	70,911		106,083
	All Upland	1,002	59,295	484,028		543,323
	Stream	293	84,614	328	18,678	103,620
	All Types	1,295	143,909	484,356	18,678	646,943
Second	Cutover (1940-1943)	1,416	37,258	347,798	11,632	396,688
	Cutover (Prior 1940)	936	9,831	111,628	1,979	123,438
	Reproduction	316	33,225	13,287		46,512
	All Upland	2,668	80,314	472,713	13,611	566,638
	Stream	60	5,439		2,700	8,139
	All Types	2,728	85,753	472,713	16,311	574,777
Third	Cutover (Prior 1940)	1,940	40,369	96,192	6,910	143,471
	Stream	39	4,172	518	7,486	12,176
	All Types	1,979	44,541	96,710	14,396	155,647
All Workings	Cutover (1940-1943)	1,968	61,381	760,915	11,632	833,928
	Cutover (Prior 1940)	2,876	50,200	207,820	8,889	266,909
	Reproduction	766	68,397	84,198		152,595
	All Upland	5,610	179,978	1,052,933	20,521	1,253,432
	Stream	392	94,225	846	28,864	123,935
	All Types	6,002	274,203	1,053,779	49,385	1,377,367

SUMMARY OF RIBES ERADICATION, 1929-1943
CLEARWATER OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1943)	552	1,416		1,968	2,811	833,928	
Burn (1940-1943)		60		60	232	134,749	
Cutover (Prior 1940)	27,726	33,989	10,875	72,590	73,067	22,316,093	
Burn (Prior 1940)	1,045	432		1,477	1,777	1,285,330	
Reproduction	71,329	21,487	2,324	95,140	142,387	36,913,755	
Pole	29,211	13,995		43,206	24,030	4,896,421	
Mature	219,289	16,067		235,356	107,681	24,234,186	
Brush	2,795	79		2,874	2,578	732,633	
Subalpine	122			122	118	53,948	
Meadow-Field	1,890			1,890			
All Upland	353,959	87,525	13,199	454,683	354,661	91,401,643	
Stream (Hand)	42,277	22,101	2,420	66,798	65,195	14,426,521	
Stream (Chemical)	15,016	5,875	537	21,428	39,843	2,763,933	921,511
Stream (Mechanical)	65	13		78	1,258	188,983	
Stream (Zone)		1,666		1,666	1,129	280,094	
All Stream	42,342	23,780	2,420	68,542	107,425	17,659,531	
All Types	396,301	111,305	15,619	523,225	462,106	109,060,574	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days	Ribes	Gallons Spray
Cutover (1940-1943)	552	1,018	437,240		1.84	792	
Cutover (Prior 1940)	27,726	25,888	10,610,089		.93	383	
Burn (Prior 1940)	1,045	1,246	917,609		1.19	878	
Reproduction	71,329	108,331	33,428,751		1.52	469	
Pole	29,211	16,138	3,785,629		.55	130	
Mature	219,289	99,880	23,422,354		.46	107	
Brush	2,795	2,536	729,247		.91	261	
Subalpine	122	118	53,948		.97	442	
Meadow-Field	1,890						
All Upland	353,959	255,155	73,384,867		.72	207	
Stream (Hand)	42,277	45,712	11,484,889		1.08	272	
Stream (Chemical)	15,016	31,155	2,383,370	794,190	2.07	159	53
Stream (Mechanical)	65	1,233	188,983		18.97	2,907	
All Stream	42,342	78,100	14,057,242		1.84	332	
All Types	396,301	333,255	87,442,109		.84	221	
TABLE 7B - SECOND WORKING							
Cutover (1940-1943)	1,416	1,793	396,688		1.27	280	
Burn (1940-1943)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	33,989	35,423	10,633,485		1.04	313	
Burn (Prior 1940)	432	531	367,721		1.23	851	
Reproduction	21,487	31,058	3,237,981		1.45	151	
Pole	13,995	7,892	1,110,792		.56	79	
Mature	16,067	7,801	811,832		.49	51	
Brush	79	42	3,386		.53	43	
All Upland	87,525	84,772	16,696,634		.97	191	
Stream (Hand)	22,101	17,670	2,689,294		.80	122	
Stream (Chemical)	5,875	8,142	359,755	119,985	1.39	61	20
Stream (Mechanical)	13	25			1.92		
Stream (Zone)	1,666	1,129	280,094		.68	168	
All Stream	23,780	26,966	3,329,143		1.13	140	
All Types	111,305	111,738	20,025,777		1.00	180	
TABLE 7C - THIRD WORKING							
Cutover (Prior 1940)	10,875	11,756	1,072,519		1.08	99	
Reproduction	2,324	2,998	247,023		1.29	106	
All Upland	13,199	14,754	1,319,542		1.12	100	
Stream (Hand)	2,420	1,813	252,339		.75	104	
Stream (Chemical)	537	546	20,808	7,336	1.02	39	14
All Stream	2,420	2,359	273,146		.97	113	
All Types	15,619	17,113	1,592,688		1.10	102	

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1943
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man-Days	Ribes	Gallons Per Sprayed Area
First	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256	41
	EQ-Coop.	24,005	16,862	3,769,434	118,973	.70	157	34
	EQ-Emerg.	81,649	73,206	20,560,823	88,983	.90	252	75
	FS-Reg.	77,340	62,447	20,896,355	129,886	.81	270	37
	FS-Emerg.	43,963	36,790	14,033,179	11,694	.84	319	79
	CCC	164,932	138,677	27,053,090	364,790	.84	164	73
	Total	396,301	333,255	87,442,109	794,190	.84	221	52
Second	EQ-Coop.	7,215	5,945	899,778	8,404	.82	125	5
	EQ-Emerg.	46,995	45,667	9,160,811	45,754	.97	195	29
	FS-Reg.	25,309	27,162	4,329,171	12,480	1.07	171	5
	FS-Emerg.	10,747	7,526	689,942	10,051	.70	64	22
	CCC	21,039	25,438	4,946,075	43,296	1.21	235	27
	Total	111,305	111,738	20,025,777	119,985	1.00	180	16
Third	EQ-Coop.	6,292	6,599	399,712	2,445	1.05	64	63
	EQ-Emerg.	5,326	6,404	676,459	2,110	1.20	127	19
	FS-Reg.	1,292	1,291	102,138		1.00	79	
	FS-Emerg.	1,198	1,066	171,901	2,270	.89	143	13
	CCC	1,511	1,753	242,478	511	1.16	160	2
	Total	15,619	17,113	1,592,688	7,336	1.10	102	13
All Workings	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256	41
	EQ-Coop.	37,512	29,406	5,068,924	129,822	.78	135	25
	EQ-Emerg.	133,970	125,277	30,398,093	136,847	.94	227	47
	FS-Reg.	103,941	90,900	25,327,664	142,366	.87	244	25
	FS-Emerg.	55,908	45,382	14,895,022	24,015	.81	266	31
	CCC	187,482	165,868	32,241,643	408,597	.88	172	60
	Total	523,225	462,106	109,060,574	921,511	.88	208	39

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1943
CLEARWATER OPERATION

Working	Number of Acres Worked						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	151,097	3,680	154,777	78,834	162,690	241,524	396,301
Second	49,459	628	50,087	15,200	46,018	61,218	111,305
Third	3,780	12	3,792	1,345	10,482	11,827	15,619
Total	204,336	4,320	208,656	95,379	219,190	314,569	523,225

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1943
CLEARWATER OPERATION

Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	151,097	44,773	195,870	8,860	204,730
Public Domain	3,680	350	4,030		4,030
Subtotal Federal	154,777	45,123	199,900	8,860	208,760
State	78,834	2,956	81,790	11,200	92,990
Private	162,690	17,620	180,310	27,940	208,250
Subtotal Other	241,524	20,576	262,100	39,140	301,240
Total	396,301	65,699	462,000	48,000	510,000

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1943
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (1940-1943)	552	24,123	413,117					437,240
	Cutover (Prior 1940)	27,726	2,100,601	8,431,923	38,603	27,752	11,210		10,610,089
	Burn (Prior 1940)	1,045	74,796	838,377	568		3,868		917,609
	Reproduction	71,329	7,928,610	25,245,707	75,977	47,326	131,131		33,428,751
	Pole	29,211	2,467,634	1,278,820	31,617	6	7,090	462	3,785,629
	Mature	219,289	16,261,450	6,795,503	197,832	107,922	59,621	26	23,422,354
	Brush	2,795	210,516	490,931	17,270	114	10,416		729,247
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	353,959	29,121,230	43,494,826	361,867	183,120	223,336	488	73,384,867
	Stream	42,342	10,239,770	324,583	2,765,661	701,834	25,394		14,057,242
	All Types	396,301	39,361,000	43,819,409	3,127,528	884,954	248,730	488	87,442,109
Second	Cutover (1940-1943)	1,416	37,258	347,798	11,632				396,688
	Burn (1940-1943)	60	32,168	102,581					134,749
	Cutover (Prior 1940)	33,989	1,184,141	9,356,959	79,585	724	12,076		10,633,485
	Burn (Prior 1940)	432	19,437	342,837	5,447				367,721
	Reproduction	21,487	753,357	2,472,573	12,011	4	36		3,237,981
	Pole	13,995	545,661	548,785	16,095	1	250		1,110,792
	Mature	16,067	395,208	400,473	15,768	116		267	811,832
	Brush	79	424	2,962					3,386
	All Upland	87,525	2,967,654	13,574,968	140,538	845	12,362	267	16,696,634
	Stream	23,780	1,893,616	516,470	826,524	76,716	9,141	6,676	3,329,143
	All Types	111,305	4,861,270	14,091,438	967,062	77,561	21,503	6,943	20,025,777
Third	Cutover (Prior 1940)	10,875	204,433	841,207	26,736		143		1,072,519
	Reproduction	2,324	126,520	118,555	1,934		14		247,023
	All Upland	13,199	330,953	959,762	28,670		157		1,319,542
	Stream	2,420	188,778	2,573	58,979	22,816			273,146
	All Types	15,619	519,731	962,335	87,649	22,816	157		1,592,688
All Workings	Cutover (1940-1943)	1,968	61,381	760,915	11,632				833,928
	Burn (1940-1943)	60	32,168	102,581					134,749
	Cutover (Prior 1940)	72,590	3,489,175	18,630,089	144,924	28,476	23,429		22,316,093
	Burn (Prior 1940)	1,477	94,233	1,181,214	6,015		3,868		1,285,330
	Reproduction	95,140	8,808,487	27,836,835	89,922	47,330	131,181		36,913,755
	Pole	43,206	3,013,295	1,827,605	47,712	7	7,340	462	4,896,421
	Mature	235,356	16,656,658	7,195,976	213,600	108,038	59,621	293	24,234,186
	Brush	2,874	210,940	493,893	17,270	114	10,416		732,633
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	454,683	32,419,837	58,029,556	531,075	183,965	235,855	755	91,401,043
	Stream	68,542	12,322,164	843,626	3,651,164	801,366	34,535	6,676	17,659,531
	All Types	523,225	44,742,001	58,873,182	4,182,239	985,331	270,390	7,431	109,060,574

BLISTER RUST CONTROL WORK, ST. JOE OPERATION, 1943

By
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INTRODUCTION

White pine blister rust control activities and accomplishments during the 1943 field season are explained and summarized in the following report. This report also summarizes in tabular form the progress made since 1929 when control work first started.

The control job is well started but not yet completed. Out of the 884,925 acres of white pine type originally included within the control boundary 536,902 or 62 per cent has been worked once and 165,739 or 19 per cent has received subsequent workings.

The steady inroads of the rust since its establishment in 1923 and the fluctuations in the size of program have called for continual adjustment in work policies. During the past season careful attention was given to all areas within the control boundary in order that they may be classified correctly. As a result of the area analysis approximately 25 per cent of the control area supporting the most valuable stands of young pine was placed in the highest working priority, 58 per cent was placed in a deferred status denoting lower priority in values or areas on which working may be temporarily deferred and 17 per cent is classed for dropping from the control area.

ORGANIZATION AND ADMINISTRATION

Blister rust control work on the St. Joe operation was organized and administered in accordance with the cooperative working agreements. Full responsibility for the administration of the regular Forest Service camps came within the jurisdiction of the Forest Service personnel. Technical advice was afforded by the Bureau of Entomology and Plant Quarantine personnel as in previous years. All phases of control activities for the cooperative camps on state and private lands were handled by the Bureau personnel.

The blister rust control 1943 field organization was as follows:

Bureau of Entomology and Plant Quarantine	U. S. Forest Service
F. J. Heinrich, Technical Supervisor	D. J. Moore, Forest Officer
W. F. Painter, Assistant Operation Supervisor in charge of checking	Byron Amsbaugh, Unit Supervisor

Program	Number Camps	Number Workers	Number Checkers
EQ-Cooperative	2	140	1
FS-Regular	7	390	1

Total number employed on blister rust control 530

Field headquarters at Clarkia, Idaho, maintained by the Bureau were used as an operating base for Bureau and some Forest Service activities. Warehousing and supplying of subsistence for all classes of camps were handled through the Clarkia Ranger Station.

The first Forest Service camp was established May 11. Additional camps were put into operation as men became available. The two Bureau and seven Forest Service camps were fully manned and crews working by June 18. All camps were closed by August 31. The early closing was necessitated by boys returning to school.

Boys 16 and 17 years of age and nearly 100 per cent inexperienced in woods work along with inexperienced foremen created many new problems. With careful planning and intensive training satisfactory work was accomplished. This personnel situation was due entirely to the fact that employees of past years were either in the armed forces or other vital war work. An effort was made to secure experienced men but they were not available.

The Forest Service secured their boys by local recruitment and through the Forest Service labor pool. This pool consisted of the man power recruited by the supervisors' offices throughout the country. Men from this pool were then sent to the different forests where there was a shortage of man power. The policy worked quite satisfactorily. A large number of boys was secured in this manner who otherwise would not have been available. The workers for the Bureau camps were recruited through the State Forester's Office, Boise, Idaho, and the Blister Rust Control Office in Spokane, Washington.

In the future a more careful selection of boys must be made. There were too many boys hired who were unsuited to woods work resulting in a high labor turnover. This proved both costly to the employee as well as the employer, and in several instances resulted in adverse criticism of the governmental agencies involved.

LOCATION AND DESCRIPTION OF AREAS

Renfro Creek area consisted primarily of open pole, 40-60 year age class. The ribes were light and working conditions were generally not difficult. The work this year was performed in the S. $\frac{1}{2}$, S. $\frac{1}{2}$, secs. 4 and 5; the N. $\frac{1}{2}$, N. $\frac{1}{2}$, secs. 8 and 9 and a small portion on the east side of sec. 7; all in T. 44 N., R. 1 E. The 1943 work was all second working and saw the completion of all work in this block. This area has now been protected.

Willow Creek area included 300 acres of 1939-40 plantation and natural reproduction along with 550 acres of open pole type. The younger stands have been given three workings and the pole type, two workings. The work was performed

in the W. ½, sec. 12; W. ¼, E. ½, sec. 12; W. ½, sec. 13; N.E. ¼, sec. 14 in T. 43 N., R . 3 W. and the S.E. ¼, N.W. ¼, sec. 7, T. 43 N., R. 2 W. The pole type is now protected but the plantation will need a small amount of additional work. There is one camp season's work remaining in this drainage.

Hidden Creek area camp worked in the upper end of the West Fork of the St. Maries River and Long Slim Creek drainages. Work was performed in the E. ½, sec. 26; S.W. ¼, sec. 26; E. ½, N.W. ¼, sec. 26; W. ½, N.W. ¼, sec. 35; S. ½, sec. 27; S.E. ¼, sec. 28; S. ½, N.E. ¼, sec. 28; N.E. ¼, sec. 33 and the N. ½, N.W. ¼, sec. 34, T. 42 N., R. 1 E. The work block consisted of 1,290 acres of which 130 acres were difficult stream type and the remainder, open reproduction, 20-40 year age class. Three workings have now been given 600 acres and the remainder covered for the second time.

Catspur camp area of 115 acres of open reproduction 20-30 year age class, 1,200 acres of open pole 60-80 year age class and 40 acres of stream type lying in the Catspur and Log Creek drainages. This area consists of that portion of sec. 19 in the Catspur drainage; all of sec. 20 except a portion in the S.E. ¼; all that portion in N.W. ¼, sec. 29 lying north of Catspur Creek and the west side of Log Creek in sec. 30, T. 42 N., R. 2 E. The infection and ribes were light on the upland but the stream type was heavy working. All of this area has been given three workings and most of it will be placed on maintenance.

Maizie Creek camp area consisted of 550 acres of open reproduction, 560 acres of open pole and 130 acres of stream type. The area is in the West Fork of the St. Maries River and Long Slim Creek drainages. 1943 work was performed in N.E. ¼, sec. 24; S. ½, sec. 24; all that portion of sec. 25 lying north of Long Slim Creek and S. ½, S.E. ¼, sec. 23, T. 42 N., R. 1 E; S.W. ¼, sec. 19 and N.W. ¼, sec. 30, T. 42 N., R. 2 E. Ribes and infection were light except along the streams. All area was worked for the third time except that area in S.E. ¼, sec. 23, T. 42 N., R. 1 E. which received second working.

Railroad Creek camp area was made up of white pine plantations on Ramsey and Railroad Creeks, which were established in 1915. This area is that portion of the S.W. ¼, sec. 27 lying south of the North Fork of St. Joe River; N.W. ¼, sec. 34; W. ½, N.E. ¼, sec. 34 and a ten chain strip along the east side of Railroad Creek from the center of sec. 28 to the center of sec. 33, all in T. 47 N., R. 5 E. A total of 300 acres was worked by this camp which was mostly upland. The ribes only ran 50 per acre but the working conditions were difficult due to the brush density and windfalls. All ground covered by this camp was third working.

Bullion Creek camp area was almost equally divided between stream type and upland acreage with 200 acres of each. The 1943 work area was that portion of sec. 36, T. 47 N., R. 5 E. lying south of North Fork of St. Joe River and a five chain strip on the north side of sec. 1, T. 46 N., R. 5 E. A small plantation in the N.W. ¼, sec. 31, T. 47 N., R. 6 E, was also worked. Most of the area was worked for the third time with 25 ribes per acre removed. The acreage receiving second working supported 60 ribes per acre. The working conditions were difficult due to windfalls on the upland and the dense growth intermingled with numerous beaver dams on stream type.

The two cooperative camps were located on Long Meadow Creek, Camp 201 at Round Meadows and Camp 202 on Butterfield Meadows. A total of 3,675 acres of area logged during the period of 1931-37 was worked. Second working was performed on 2,690 acres. This area was located in S. ½, sec. 35, T. 40 N., R. 1 E; N. ½, sec. 2, T. 39 N, R. 1 E. and the area south of road in the S. ½, sec. 2, area south of main stream in sec. 9, and secs. 10, 11, 12 and a portion in sec. 14.

The remainder was first working. This included all of sec. 15 except the N.W. ¼, N. ½, N.W. ¼, sec. 14; S. ½, sec. 21 and the N. ½, N.E. ¼, sec. 28.

This area formerly produced a good stand of pine. The area is cut up and somewhat patchy but as a whole is coming back well to white pine. The area contains only light infection and the protection is not costly.

There still remains some unworked area in T. 39 N., R. 1 E, secs. 21 and 28, that supports good reproduction and should be protected.

METHODS AND EQUIPMENT

Standard approved methods for hand ribes eradication were used throughout the season. In nearly all cases string lanes were laid in advance of the crew. Two to three men equipped with ribes picks worked within each lane. A crew leader worked behind directing the crew and reworking the ground. A straw boss was in charge of three to four crews working in gang formation. This method worked particularly well with the youthful labor employed.

Chemical ribes eradication was on a small scale this year as the work was mostly mop-up and the Ribes petiolare were very scattered.

The Forest Service personnel held a three-day training school and gave all camp bosses intensive training prior to the establishment of camp. The two Bureau camp bosses were trained on the job. Intensive training was given all workers throughout the summer.

CHECKING AND SURVEYS

The regular check formerly made on work areas was discontinued temporarily in 1943. The few experienced eradication men who might have been trained as checkers were used in training and directing the inexperienced workers in ribes eradication. Occasional sample checks were made on upland areas to give the camp foremen some index as to the quality of crew work.

With the assistance of experienced checkers a careful check was made on all streams sprayed for R. petiolare. The streams in most cases were checked 100 per cent and all missed R. petiolare bushes were tagged. The tagging of the missed ribes greatly facilitated the respray work and insured a complete coverage of all streams.

There is a definite need for regular check on worked areas and men should be trained and used for this work whenever possible. Pine disease surveys were carried on to a limited extent during the past season. A total of 13.8 strip

miles was run on areas that were being surveyed to determine white pine stocking. The results of the disease survey are as follows:

	T.	R.	Sections	Chains Run	Trees Exam.	Per Cent Trees Infected	Per Cent Fatal	Damage to Present Stocking
Marble Cr.	44 N.	2-3 E.	20, 21, 25 to 36	501	1,001	40	38	15 %
Cedar Cr.	42 N.	1 E.	1, 2	70	140	33	27	10 %
Hatton Cr.	43 N.	1 E.	3, 4	233	1,667	2	2	None
Mica Cr.	44 N. 45 N.	1-2 E. 2 E.	18, 13 31 to 33	301	462	45	45	35 %

In examining the above table one notes that the per cent of infection does not mean that the stand is damaged to the same extent. Overstocked areas can be quite heavily infected without damage to the stand.

Considerable pine survey work was performed on the St. Joe operation during the past field season. A systematic survey was made on specific areas to determine the degree of stocking, general infection and working conditions. This work was performed by the Forest Service camp bosses at the close of the regular field season.

PINE SURVEY ACREAGE

Willow Creek	-	2,400 acres
Cedar Creek	-	2,500 acres
Mica Creek	-	9,600 acres
Marble Creek	-	14,200 acres

Total Acres Covered 28,700

A more general survey was run on all areas upon which more specific information was needed for correct classification. Areas were placed in classes based upon a number of influencing characteristics affecting the stands present and future values.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 14,263.91
	Regular BLR-3-4	31,445.69
	Subtotal	$ 45,709.60
State of Idaho and Potlatch Timber Protective Association	State and Private BLR-3-4	$ 4,018.35
Forest Service	Regular BLR-4	$131,450.50
Total		$181,178.45

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
ST. JOE OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	Total
Sal. perm. men	$12,471.49			$12,471.49	$ 6,299.42	$ 18,770.91
Sal. temp. men	151.32	$ 6,034.63	$ 289.83	6,475.78		6,475.78
Wages, temp. labs.		20,541.01	3,385.85	23,926.86	95,665.53	119,592.39
Subs. supplies	27.07	4,168.19	342.67	4,537.93	19,720.89	24,258.82
Equipment	34.06	32.61		66.67	6,911.80	6,978.47
Travel & transp.	537.97	253.32		791.29	1,649.03	2,440.32
Chemicals						
Twine						
Other Supplies	1,042.00	415.93		1,457.93	1,203.83	2,661.76
Total	$14,263.91	$31,445.69	$4,018.35	$49,727.95	$131,450.50	$181,178.45

SUMMARY OF RIBES ERADICATION, 1943
ST. JOE OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (Prior 1940)	985	2,651	45	3,681	3,552	226,067	
Reproduction		759	2,064	2,823	5,440	196,383	
Pole		858	2,102	2,960	2,009	61,861	
All Upland	985	4,268	4,211	9,464	11,001	484,311	
Stream (Hand)			495	495	1,494	65,301	
Stream (Chemical)			286	286	235	11,736	3,912
All Stream			495	495	1,729	77,037	
All Types	985	4,268	4,706	9,959	12,730	561,348	

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man-Days	Ribes	Gallons Spray
Cutover (Prior 1940)	985	762	138,580		.77	141	

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	2,651	2,749	86,992		1.04	33	
Reproduction	759	935	32,906		1.23	43	
Pole	858	672	20,224		.78	24	
All Types	4,268	4,356	140,122		1.02	33	

TABLE 3C - THIRD WORKING

Cutover (Prior 1940	45	41	495		.91	11	
Reproduction	2,064	4,505	163,477		2.18	79	
Pole	2,102	1,337	41,637		.64	20	
All Upland	4,211	5,883	205,609		1.40	49	
Stream (Hand)	495	1,494	65,301		3.02	132	
Stream (Chemical)	286	235	11,736	3,912	.82	41	14
All Stream	495	1,729	77,037		3.49	156	
All Types	4,706	7,612	282,646		1.62	60	

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man-Days	Ribes	Gallons Per Sprayed Area
First	EQ-Coop.	985	762	138,580		.77	141	
Second	EQ-Coop.	2,645	2,731	85,044		1.03	32	
	FS-Reg.	1,623	1,625	55,078		1.00	34	
	Total	4,268	4,356	140,122		1.02	33	
Third	EQ-Coop.	45	41	495		.91	11	
	FS-Reg.	4,661	7,571	282,151	3,912	1.62	61	14
	Total	4,706	7,612	282,646	3,912	1.62	60	14
All Workings	EQ-Coop.	3,675	3,534	224,119		.96	61	
	FS-Reg.	6,284	9,196	337,229	3,912	1.46	54	14
	Total	9,959	12,730	561,348	3,912	1.28	56	14

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943
ST. JOE OPERATION

State	Working	Number of Acres Worked														
		By Forest Service				By Bureau of Entomology and Plant Quarantine				Total						
										Federal			Other			
		Natl. For.	Pub. Dom.	Private	Total	Natl. For.	State	Private	Total	Natl. For.	Pub. Dom.	Total	State	Private	Total	Total
Idaho	First						80	905	985				80	905	985	985
	Second	1,101	270	252	1,623	645	583	1,417	2,645	1,746	270	2,016	583	1,669	2,252	4,268
	Third	2,622	837	1,202	4,661	45			45	2,667	837	3,504		1,202	1,202	4,706
	Total	3,723	1,107	1,454	6,284	690	663	2,322	3,675	4,413	1,107	5,520	663	3,776	4,439	9,959

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	
First	Cutover (Prior 1940)	985	89,774	48,680	126		138,580
Second	Cutover (Prior 1940)	2,651	53,302	33,621	69		86,992
	Reproduction	759	25,755	3,113		4,038	32,906
	Pole	858	3,889	16,335			20,224
	All Types	4,268	82,946	53,069	69	4,038	140,122
Third	Cutover (Prior 1940)	45	384	111			495
	Reproduction	2,064	62,117	101,298	62		163,477
	Pole	2,102	37,733	3,829		75	41,637
	All Upland	4,211	100,234	105,238	62	75	205,609
	Stream	495	62,055	17	14,582	383	77,037
	All Types	4,706	162,289	105,255	14,644	458	282,646
All Workings	Cutover (Prior 1940)	3,681	143,460	82,412	195		226,067
	Reproduction	2,823	87,872	104,411	62	4,038	196,383
	Pole	2,960	41,622	20,164		75	61,861
	All Upland	9,464	272,954	206,987	257	4,113	484,311
	Stream	495	62,055	17	14,582	383	77,037
	All Types	9,959	335,009	207,004	14,839	4,496	561,348

SUMMARY OF RIBES ERADICATION, 1929-1943
ST. JOE OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1943)		211	54	265	189	14,002	
Cutover (Prior 1940)	1,994	5,333	275	7,602	7,754	730,026	
Burn (Prior 1940)		20		20	42	377	
Reproduction	217,890	78,446	11,210	307,546	352,453	90,898,319	
Pole	86,838	35,001	4,287	126,126	56,229	9,140,579	
Mature	192,059	10,797	170	203,026	87,223	22,823,872	
Brush	2,452	431		2,883	1,924	679,187	
Subalpine	200			200	416	90,809	
All Upland	501,433	130,239	15,996	647,668	506,230	124,377,171	
Stream (Hand)	34,678	12,611	6,866	54,155	99,021	27,406,624	
Stream (Chemical)	7,404	3,245	1,025	11,674	27,212	2,401,836	800,612
Stream (Mechanical)	791	27		818	10,420	409,100	
All Stream	35,469	12,638	6,866	54,973	136,653	30,217,560	
All Types	536,902	142,877	22,862	702,641	642,883	154,594,731	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man-Days	Ribes	Gallons Spray
Cutover (Prior 1940)	1,994	1,416	238,912		.71	120	
Reproduction	217,890	242,526	81,205,877		1.11	373	
Pole	86,838	33,082	7,780,055		.38	90	
Mature	192,059	78,643	21,688,812		.41	113	
Brush	2,452	1,881	676,620		.77	276	
Subalpine	200	416	90,809		2.08	454	
All Upland	501,433	357,964	111,681,085		.71	223	
Stream (Hand)	34,678	65,337	20,953,990		1.88	604	
Stream (Chemical)	7,404	21,683	2,009,118	669,706	2.93	271	90
Stream (Mechanical)	791	10,101	395,600		12.77	500	
All Stream	35,469	97,121	23,358,708		2.74	659	
All Types	536,902	455,085	135,039,793		.85	252	

TABLE 7B - SECOND WORKING

Cutover (1940-1943)	211	147	6,191		.70	29	
Cutover (Prior 1940)	5,333	5,758	429,158		1.08	80	
Burn (Prior 1940)	20	42	377		2.10	19	
Reproduction	78,446	92,265	9,065,885		1.18	116	
Pole	35,001	20,545	1,290,530		.59	37	
Mature	10,797	8,255	1,097,018		.76	102	
Brush	431	43	2,567		.10	6	
All Upland	130,239	127,055	11,891,726		.98	91	
Stream (Hand)	12,611	22,464	4,843,003		1.78	384	
Stream (Chemical)	3,245	4,731	334,989	111,663	1.46	103	34
Stream (Mechanical)	27	319	13,500		11.81	500	
All Stream	12,638	27,514	5,191,492		2.18	411	
All Types	142,877	154,569	17,083,218		1.08	120	

TABLE 7C - THIRD WORKING

Cutover (1940-1943)	54	42	7,811		.78	145	
Cutover (Prior 1940)	275	580	61,956		2.11	225	
Reproduction	11,210	17,662	626,557		1.58	56	
Pole	4,287	2,602	69,994		.61	16	
Mature	170	325	38,042		1.91	224	
All Upland	15,996	21,211	804,360		1.33	50	
Stream (Hand)	6,866	11,220	1,609,631		1.63	234	
Stream (Chemical)	1,025	798	57,729	19,243	.78	56	19
All Stream	6,866	12,018	1,667,360		1.75	243	
All Types	22,862	33,229	2,471,720		1.45	108	

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1943
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man-Days	Ribes	Gallons Per Sprayed Area
First	EQ-Coop.	18,058	14,246	4,002,581	56,611	.79	222	41
	EQ-Emerg.	189,429	118,249	37,196,488	63,506	.62	196	101
	FS-Reg.	86,539	90,374	26,041,309	262,145	1.04	301	95
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216	129
	CCC	171,895	187,078	52,466,309	185,968	1.09	305	101
	Total	536,902	455,085	135,039,793	669,706	.85	252	90
Second	EQ-Coop.	11,974	9,263	447,029	2,674	.77	37	11
	EQ-Emerg.	42,097	36,727	5,940,959	10,557	.87	141	32
	FS-Reg.	71,058	75,427	6,923,254	40,191	1.06	97	25
	CCC	17,748	33,152	3,771,976	58,241	1.87	213	55
	Total	142,877	154,569	17,083,218	111,663	1.08	120	34
Third	EQ-Coop.	45	41	495		.91	11	
	EQ-Emerg.	2,993	2,922	455,940	3,025	.98	152	12
	FS-Reg.	17,225	25,151	1,363,267	11,721	1.46	79	17
	CCC	2,599	5,115	652,018	4,497	1.97	251	46
	Total	22,862	33,229	2,471,720	19,243	1.45	108	19
All Workings	EQ-Coop.	30,077	23,550	4,450,105	59,285	.78	148	36
	EQ-Emerg.	234,519	157,898	43,593,387	77,088	.67	186	64
	FS-Reg.	174,822	190,952	34,327,830	314,057	1.09	196	62
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216	129
	CCC	192,242	225,345	56,890,303	248,706	1.17	296	83
	Total	702,641	642,883	154,594,731	800,612	.91	220	69

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1943
ST. JOE OPERATION

Working	Number of Acres Worked						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	216,208	12,578	228,786	67,162	240,954	308,116	536,902
Second	76,461	5,159	81,620	17,277	43,980	61,257	142,877
Third	12,401	1,027	13,428	1,615	7,819	9,434	22,862
Total	305,070	18,764	323,834	86,054	292,753	378,807	702,641

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1943
ST. JOE OPERATION

Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	216,208	84,783	300,991	11,089	312,080
Public Domain	12,578	10,847	23,425	1,040	24,465
Subtotal Federal	228,786	95,630	324,416	12,129	336,545
State	67,162	26,973	94,135	20,800	114,935
Private	240,954	135,945	376,899	56,546	433,445
Subtotal Other	308,116	162,918	471,034	77,346	548,380
Total	536,902	258,548	795,450	89,475	884,925

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1943
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (Prior 1940)	1,994	154,671	78,805	5,395	41			238,912
	Reproduction	217,890	15,252,226	65,332,727	121,897	344,709	154,318		81,205,877
	Pole	86,838	3,234,919	4,383,484	21,170	63,499	76,983		7,780,055
	Mature	192,059	10,956,325	10,404,806	28,217	42,519	256,945		21,688,812
	Brush	2,452	93,470	579,731	1,987	1,432			676,620
	Subalpine	200	54,975	35,834					90,809
	All Upland	501,433	29,746,586	80,815,387	178,666	452,200	488,246		111,681,085
	Stream	35,469	16,372,384	888,029	3,331,826	2,749,642	16,695	132	23,358,708
	All Types	536,902	46,118,970	81,703,416	3,510,492	3,201,842	504,941	132	135,039,793
Second	Cutover (1940-1943)	211	4,089	2,102					6,191
	Cutover (Prior 1940)	5,333	180,681	247,507	798	172			429,158
	Burn (Prior 1940)	20	61	316					377
	Reproduction	78,446	3,436,143	5,520,749	35,104	62,311	11,578		9,065,885
	Pole	35,001	559,242	707,943	4,858	18,483	4		1,290,530
	Mature	10,797	487,781	576,618	778	19	31,822		1,097,018
	Brush	431	456	2,111					2,567
	All Upland	130,239	4,668,453	7,057,346	41,538	80,985	43,404		11,891,726
	Stream	12,638	3,045,535	163,110	1,081,834	753,469	6,073	141,471	5,191,492
	All Types	142,877	7,713,988	7,220,456	1,123,372	834,454	49,477	141,471	17,083,218
Third	Cutover (1940-1943)	54	6,219	1,592					7,811
	Cutover (Prior 1940)	275	15,727	43,408		2,821			61,956
	Reproduction	11,210	259,975	353,077	6,421	7,084			626,557
	Pole	4,287	49,625	20,183	42	144			69,994
	Mature	170	32,990	3,316	8		1,728		38,042
	All Upland	15,996	364,536	421,576	6,471	10,049	1,728		804,360
	Stream	6,866	787,480	23,044	483,945	370,509		2,382	1,667,360
	All Types	22,862	1,152,016	444,620	490,416	380,558	1,728	2,382	2,471,720
All Workings	Cutover (1940-1943)	265	10,308	3,694					14,002
	Cutover (Prior 1940)	7,602	351,079	369,720	6,193	3,034			730,026
	Burn (Prior 1940)	20	61	316					377
	Reproduction	307,546	18,948,344	71,206,553	163,422	414,104	165,896		90,898,319
	Pole	126,126	3,843,786	5,111,610	26,070	82,126	76,987		9,140,579
	Mature	203,026	11,477,096	10,984,740	29,003	42,538	290,495		22,823,872
	Brush	2,883	93,926	581,842	1,987	1,432			679,187
	Subalpine	200	54,975	35,834					90,809
	All Upland	647,668	34,779,575	88,294,309	226,675	543,234	533,378		124,377,171
	Stream	54,973	20,205,399	1,074,183	4,897,605	3,873,620	22,768	143,985	30,217,560
	All Types	702,641	54,984,974	89,368,492	5,124,280	4,416,854	556,146	143,985	154,594,731

BLISTER RUST CONTROL WORK, COEUR D'ALENE OPERATION, 1943

By
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INTRODUCTION

The blister rust control program on the Coeur d'Alene National Forest during the 1943 field season consisted of a total of six camps financed by regular Forest Service appropriations and two groups of Italian war internees engaged on ribes eradication for about one month.

The season was characterized by an extreme dearth of experienced workers. Of the six men used as camp foremen only three had previous blister rust experience and none had been camp foremen before. Only eight experienced ribes eradicators were available. Four of these were used as checkers, only one of whom proved entirely satisfactory. Other factors which handicapped the orderly progress of the field season included the mandatory release of all employees under 16 years of age at the end of June after they had all been given training in the work, and the transferring of the better workers from a majority of the camps to fire protection positions.

Because of inclement weather at the start of the season and the early loss of all workers so they could return to school, the average season of ribes eradication work was only approximately two months.

ORGANIZATION AND ADMINISTRATION

The first camp was established on May 14 and was used as a foreman training camp until it was occupied by eradication crews on May 17. The last camp was established on June 14. Because of the labor shortage and the inadvisability of continuing work on the Grizzly Creek area, that camp was closed on July 30. All camps were closed by September 1. Fifteen Italian war internees from Potter Creek were engaged on ribes eradication for about one month during the latter part of July and the first part of August and another group averaging 15 in number from the Steamboat Camp was used during August.

The Forest Service was responsible for the administration and maintenance of the camps, and technical supervision was provided by the Bureau of Entomology and Plant Quarantine. The field organization was as follows:

Bureau of Entomology and Plant Quarantine	U. S. Forest Service
M. C. Riley, Technical Supervisor	A. W. Greeley, Forest Officer C. J. Pederson, Unit Supervisor

The total number of workers was 228.

LOCATION AND DESCRIPTION OF AREAS

Ribes eradication efforts were confined to plantations, sanitation areas and stands of natural reproduction. The Hudlow camp performed rework in stream type on Burnt Cabin Creek from its mouth to the mouth of Lone Cabin Creek and reworked George Creek and the next tributary of Burnt Cabin northeast of George Creek. This portion of the worked area lies in sections 8, 17, 18, 20, T. 51 N., R. 1 W. This crew also reworked nearly all of the controlled-burn plantation area on Solitaire Creek in sections 9, 16, 17, T. 52 N., R. 1 W. The Trail Creek camp did first working and rework on Hamilton Creek and first working on Coon Gulch in sections 15, 16, 22, T. 52 N., R. 1 E. Both of these areas support very good stands of natural reproduction. The Drexall Springs camp was engaged entirely on rework in natural reproduction at the head of Squeak Creek and in a 1941 white pine plantation at the head of a fork of Brett Creek. This work was in sections 11, 14, 15, 22, 23, T. 52 N., R. 2 E. The camp at Alden Creek did rework in a very fine 1922 plantation in sections 3, 4, 5, 8, 9, 10, T. 53 N., R. 3 E. The 60-man camp located at Big Creek did initial work in an excellent 30-year old plantation on the Middle Fork of Lost Creek in sections 34, 35, 36, T. 51 N., R. 4 E; first and second working in natural reproduction adjacent to 1942 work in sections 22 and 23, T. 51 N., R. 4 E; and rework on a 1941 plantation on Flat Creek in sections 5, 6, 7, 8, T. 51 N., R. 3 E. The Grizzly camp worked in natural reproduction in sections 16 and 21, T. 50 N., R. 3 E., but because of extremely difficult working conditions, heavy infection and a shortage of labor this camp was discontinued at the end of July. The Italian war internees from Potter Creek did initial stream type work on Trail Creek in section 28, T. 52 N., R. 1 E., and removed 31,918 ribes from 34 acres in 222 effective man-days. The internees from the Steamboat camp worked in stream type and cutover areas near the mouth of Bumblebee Creek in section 35, T. 50 N., R. 1 E., covering a total of 134 acres in 203 effective man-days and destroying 1,855 ribes.

The upland areas in the plantations on Brett, Alden, Flat, the Middle Fork of Lost Creek and the natural reproduction in Hamilton Creek and Coon Gulch represented comparatively easy working conditions. Stream type on all areas and natural reproduction on Grizzly and Lost Creeks presented severe working conditions while the remainder of the areas were about average. Dwarf bushes and an apparently prolonged germination period for ribes seedlings present problems on some of the areas which are reproducing to white pine following logging.

All areas worked are in Federal ownership.

METHODS AND EQUIPMENT

Due to inexperienced labor and turnover there was a decided lack of qualified straw bosses and crew leaders so that a continual training program was in progress. The method of a crew leader working behind each crew with a group of crews in adjacent lanes was used whenever possible and proved the most satisfactory under existing labor conditions. In all cases the string lines were laid in advance and the improved ribes tool was used by all crew members. The Sheely hook was used considerably, especially by crew leaders and has a

very definite use on rework areas or where the bushes are small. All workers were given training in the proper use of common woods tools before any ribes eradication work was done and a direct benefit was derived from both the safety and efficiency angles.

Within the first day or two after a worker arrived in camp he was interviewed by the camp foreman. The object was to get ideas as to the worker's background and experience as an aid in fitting the level of training to the needs of the individual. Much valuable information was gathered by the foreman which aided materially in his handling of individuals. In addition, the natural reserve automatically set up within himself by the young, inexperienced worker going into a new environment was broken down and this resulted in a much better morale since the worker felt that the foreman had a personal interest in his progress. So much was gained by all concerned that it is planned to adopt the system permanently.

CONTROL STATUS

During the period 1927 to 1943 there has been a total of 397,233 acres covered on the Coeur d'Alene operation. This consists of 336,209 acres of first working, 50,452 of second working and 10,572 of third working. Although the entire program of ribes eradication, post checking and disease survey work is considerably behind schedule for the normal, orderly progress of the work in order to obtain the best results, it is felt that satisfactory progress is being made considering the size of program allotted.

The North Fork of the Coeur d'Alene River area presents the greatest problems. Blister rust infection is probably more severe here than on any other area of comparable size on the forest, especially near the mouths of Canyon and Cascade Creeks, portions of Burnt Cabin Creek and Barney Creek. Many of the cutover areas are not reproducing to white pine even after stand improvement work has been done, and in some cases white pine has been planted without proper regard for the blister rust protection problems involved. On the other hand there are natural reproduction and pole areas as well as plantations where the status of control work is such that from now on only nominal protection costs are necessary. Areas in this category would include Deception Creek, portions of Burnt Cabin Creek, Lewelling Creek, Tom Lavin Creek, Hudlow and a large part of the Solitaire and Honey Creek burns.

The old burn area around Magee Ranger Station and north to the forest boundary is generally in a good status. A considerable portion of this area is not producing white pine naturally but there are some excellent plantations. The natural white pine reproduction in Trail Creek and its tributaries is practically free from blister rust except for one small draw opposite Callis Creek and a portion is approaching a maintenance standard. Natural reproduction in upper Independence Creek is heavily infected and because of this and the high fire hazard and difficult working conditions, no control work is contemplated here. No appreciable amount of loss from blister rust has occurred in any of the plantations but there is enough infection there now so that a rapid build-up can be expected in 1944 unless proposed work is accomplished.

The pole stands, as exemplified by upper Tepee Creek and Beaver Creek, are in very good condition. Small losses are occurring adjacent to stream type in some places such as Short Creek but about all of the work needed in connection with pole stands is in stream type and small openings.

All of the mature stands have been given what work is feasible until some disturbance occurs except where it might be necessary to work protection strips for younger stands.

What little white pine exists on the north face of the Coeur d'Alene River is badly infected and such areas as Brown, Grizzly, Scott and Lower Steamboat Creeks do not warrant further work.

Generally speaking, the North Fork presents the most serious problems due to infection, cutting and sanitation practices and the uncertainty regarding whether or not cutover areas will reproduce to white pine. In the entire control area there is very little natural reproduction which meets class 1 or class 2 standards. Considerable area has been deferred due to low white pine values and extreme working conditions. A large percentage of the double burns on white pine sites has been planted. While some areas have been lost to blister rust, it is felt that satisfactory results can be obtained with an accelerated program.

SURVEYS

Only one experienced checker was available for the 1943 field season. Because of the youth and inexperience of the available material, too much reliance cannot be placed on their efficiency. Other problems affecting the situation are the reluctance of these young, inexperienced workers to assume responsibility, an apparent dislike to working alone and their inability to plan and organize their work. In spite of these handicaps a regular check was run on all eradication areas. The advance surveys necessary for the proper planning and coordination of the work were also completed.

On the Coeur d'Alene National Forest there is an urgent need for a considerable amount of post check work. Due to the pressure of other checking work very little post check was run until after the regular ribes eradication season, which left only a short time when ribes recognition was positive. During the course of the work a total of 72.7 miles of strip was run on post check.

In 1941 a rather ambitious program of pine disease survey work was carried on but none was done in 1942. By 1943 it was possible to note the effect of 1939 and 1941 waves of infection as well as those of earlier origin and consequently all capable personnel available was used on this work after the regular season and as long as weather conditions permitted. The areas chosen for disease survey examination were those of very high priority where previous surveys had shown a start of infection or where no survey information was available. The areas covered do not represent all of those where this type of work is needed but do represent the most urgent situations. A total of 21,925 trees were examined on 35.4 miles of strip. The results of this survey are summarized as follows:

Area	Miles Strip	Trees Examined	Trees Infected	Per Cent Infection
Independence Creek, T. 52, 53 N., R. 2 E. Secs. 4, 5, 8, 32	9.3	5,908	31	.52
Senator Creek, T. 52 N., R. 2, 3 E. Secs. 7, 12, 17, 18	7.8	5,563	153	2.75
Trail Creek, T. 52 N., R. 1 E. Sec. 27	.8	370	57	15.40
Callis Creek, T. 52 N., R. 1 E. Secs. 21, 28	1.8	1,494	33	2.20
Jordan Creek, T. 53 N., R. 3 E. Secs. 15, 22, 23, 25, 26	8.6	3,895	10	.26
East Fork Coeur d'Alene, T. 53 N., R. 3 E. Secs. 17, 20	1.7	1,216	8	.66
Calamity Creek, T. 53 N., R. 3 E. Secs. 16, 17, 20, 21	5.4	3,479	2	.06

On none of the areas listed above, with the exception of Trail Creek, does the per cent of infection appear dangerous but in each case it is an increase of infection and practically all of the cankers are very healthy so that an appreciable build-up can be expected at any time. The infection found in Trail Creek is a small, isolated patch in an area which, since the survey, is not considered for protection because only a small amount of suppressed white pine is present.

Approximately two months were spent on area classification work after the end of the ribes eradication season, this being done in conjunction with the post check and pine disease survey work. The primary objective was to classify the areas considered to have the highest priority since it was realized that the entire control area could not be examined in the one season. In general the area classified includes Burnt Cabin and the remainder of the west side of the North Fork and the east side of the North Fork from Barney Creek to the head; all of the control area which has been worked in Independence Creek as well as the Declaration Creek area; Beaver Creek worked area and adjoining territory; the East Fork of the Coeur d'Alene River except the river face between Beaver Lookout and Deer Creek, and Burnt Creek; Trail and Hamilton Creeks; portions of Upper Tepee; all of the area from Senator Creek practically to Big Creek; portions of Lost Creek; a considerable portion north of the Coeur d'Alene River from Brown Creek to the mouth of the North Fork and other small scattered areas.

Better progress would have been made in this area classification work if those available for the job had been more familiar with the operation as a whole. Due to this lack of an intimate knowledge of the areas, a rather detailed examination was necessary on much of the ground classified. Past silvicultural practices in the North Fork drainage have resulted in such a wide variety of conditions that area classification, as well as blister rust control, is extremely difficult. Generally speaking, there are very few cutover areas here which will reproduce to white pine, regardless of the volume removed, without some form of stand improvement or sanitation. Even when some treatment is given there is no assurance that white pine will come in and on practically all of these areas there is a heavy ribes population.

As a general rule it appears that the best results are obtained when clean burns are followed by planting and on some areas this is the only solution. Even here the problem is not entirely solved because of delayed ribes germination in some instances. So many different silvicultural practices have been followed in the past that each small portion needs close examination before it is possible to determine whether or not it is still a white pine area.

During the course of this area classification it was found that many plantations and natural reproduction stands are in immediate need of attention. In order to protect only the class 1 stands of reproduction size so that appreciable damage from blister rust will not result, the program must be materially increased from that prevailing during the past two seasons.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 3,781.02
Forest Service	Regular BLR-4	$87,127.25
Total		$90,908.27

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine Regular BLR-1-4	Forest Service Regular BLR-4	Total
Sal. perm. men	$3,689.21	$ 8,717.73	$12,406.94
Sal. temp. men		8,787.60	8,787.60
Wages, temp. labs.		49,855.85	49,855.85
Subs. supplies		15,992.90	15,992.90
Equipment		1,264.44	1,264.44
Travel and transp.	91.81	1,465.70	1,557.51
Twine		172.80	172.80
Other supplies		870.23	870.23
Total	$3,781.02	$87,127.25	$90,908.27

SUMMARY OF RIBES ERADICATION, 1943
COEUR D'ALENE OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Cutover (Prior 1940)		112	299	411	777	36,641	3.5	8.3
Burn (Prior 1940)		90	184	274	296	23,161	10.8	16.2
Reproduction	1,111	1,118	131	2,360	3,093	116,524	5.5	13.5
Mature		113	74	187	132	5,648	4.2	8.7
Brush		77	13	90	77	13,653	9.4	20.7
All Upland	1,111	1,510	701	3,322	4,375	195,627	5.0	12.9
Stream (Hand)	109	102	35	246	1,577	98,583	14.4	23.7
All Types	1,220	1,612	736	3,568	5,952	294,210	5.3	13.3

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man-Days	Ribes	Bushes	Live Stem
Reproduction	1,111	1,249	49,995	1.12	45	1.8	9.3
Stream (Hand)	109	1,207	76,724	11.07	704	21.7	41.7
All Types	1,220	2,456	126,719	2.01	104	2.7	11.3

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	112	137	1,102	1.22	10		
Burn (Prior 1940)	90	29	3,313	.32	37	14.3	28.5
Reproduction	1,118	1,444	60,636	1.29	54	8.5	17.2
Mature	113	45	4,950	.40	44	5.5	11.0
Brush	77	66	12,229	.86	159	9.4	20.7
All Upland	1,510	1,721	82,230	1.14	54	7.8	16.7
Stream (Hand)	102	308	16,064	3.02	157	9.8	9.4
All Types	1,612	2,029	98,294	1.26	61	7.9	16.2

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	299	640	35,539	2.14	119	3.5	8.3
Burn (Prior 1940)	184	267	19,848	1.45	108	9.1	10.2
Reproduction	131	400	5,893	3.05	45	4.4	17.5
Mature	74	87	698	1.18	9	2.3	5.1
Brush	13	11	1,424	.85	110		
All Upland	701	1,405	63,402	2.00	90	4.2	10.2
Stream (Hand)	35	62	5,795	1.77	166	5.0	9.3
All Types	736	1,467	69,197	1.99	94	4.3	10.1

TABLE 4

TOTAL RIBES BY SPECIES ERADICATED, 1943
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Reproduction	1,111	42,983	5,099	1,913	49,995
	Stream (Hand)	109	69,344	134	7,246	76,724
	All Types	1,220	112,327	5,233	9,159	126,719
Second	Cutover (Prior 1940)	112	830	96	176	1,102
	Burn (Prior 1940)	90	459	2,854		3,313
	Reproduction	1,118	51,149	9,076	411	60,636
	Mature	113	4,469	481		4,950
	Brush	77	582	11,647		12,229
	All Upland	1,510	57,489	24,154	587	82,230
	Stream (Hand)	102	15,619	43	402	16,064
	All Types	1,612	73,108	24,197	989	98,294
Third	Cutover (Prior 1940)	299	33,209	2,330		35,539
	Burn (Prior 1940)	184	18,806	1,042		19,848
	Reproduction	131	1,606	4,287		5,893
	Mature	74	493	205		698
	Brush	13	129	1,295		1,424
	All Upland	701	54,243	9,159		63,402
	Stream (Hand)	35	5,588		207	5,795
	All Types	736	59,831	9,159	207	69,197
All Workings	Cutover (Prior 1940)	411	34,039	2,426	176	36,641
	Burn (Prior 1940)	274	19,265	3,896		23,161
	Reproduction	2,360	95,738	18,462	2,324	116,524
	Mature	187	4,962	686		5,648
	Brush	90	711	12,942		13,653
	All Upland	3,322	154,715	38,412	2,500	195,627
	Stream (Hand)	246	90,551	177	7,855	98,583
	All Types	3,568	245,266	38,589	10,355	294,210

SUMMARY OF RIBES ERADICATION, 1927-1943
COEUR D'ALENE OPERATION

TABLE 5 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes
Cutover (Prior 1940)	11,914	7,651	4,260	23,825	34,631	6,872,758
Burn (Prior 1940)	5,889	1,251	184	7,324	7,892	1,632,367
Reproduction	84,512	16,718	2,174	103,404	165,291	21,959,308
Pole	66,032	5,801	825	72,658	36,112	5,243,650
Mature	141,857	11,006	1,900	154,763	97,979	15,462,805
Brush	10,555	584	13	11,152	15,794	2,345,681
Subalpine	485			485	283	76,762
Meadow-Field	157			157		
All Upland	321,401	43,011	9,356	373,768	357,982	53,593,331
Stream (Hand)	13,313	4,531	1,216	19,060	60,847	12,412,364
Stream (Mechanical)	1,123	100		1,223	6,830	634,731
Stream (Zone)	372	2,810		3,182	3,825	346,168
All Stream	14,808	7,441	1,216	23,465	71,502	13,393,263
All Types	336,209	50,452	10,572	397,233	429,484	66,986,594

TABLE 5A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
				Man-Days	Ribes
Cutover (Prior 1940)	11,914	16,605	4,448,118	1.39	373
Burn (Prior 1940)	5,889	4,555	1,028,668	.77	175
Reproduction	84,512	134,363	19,793,301	1.59	234
Pole	66,032	31,587	4,519,399	.48	68
Mature	141,857	88,242	14,210,671	.62	100
Brush	10,555	14,983	2,234,161	1.42	212
Subalpine	485	283	76,762	.58	158
Meadow-Field	157				
All Upland	321,401	290,618	46,311,080	.90	144
Stream (Hand)	13,313	49,954	11,041,957	3.75	829
Stream (Mechanical)	1,123	5,956	587,434	5.30	523
Stream (Zone)	372	1,315	141,227	3.53	380
All Stream	14,808	57,225	11,770,618	3.86	795
All Types	336,209	347,843	58,081,698	1.03	173

TABLE 5B - SECOND WORKING

Cutover (Prior 1940)	7,651	11,490	1,838,681	1.50	240
Burn (Prior 1940)	1,251	3,070	583,851	2.45	467
Reproduction	16,718	26,877	1,958,253	1.61	117
Pole	5,801	3,781	611,121	.65	105
Mature	11,006	8,701	1,141,546	.79	104
Brush	584	800	110,096	1.37	189
All Upland	43,011	54,719	6,243,548	1.27	145
Stream (Hand)	4,531	9,462	1,269,269	2.09	280
Stream (Mechanical)	100	874	47,294	8.74	473
Stream (Zone)	2,810	2,510	204,941	.89	73
All Stream	7,441	12,845	1,521,504	1.73	204
All Types	50,452	67,565	7,765,052	1.34	154

TABLE 5C - THIRD WORKING

Cutover (Prior 1940)	4,260	6,536	585,959	1.53	138
Burn (Prior 1940)	184	267	19,848	1.45	108
Reproduction	2,174	4,051	207,754	1.86	96
Pole	825	744	113,130	.90	137
Mature	1,900	1,036	110,588	.55	58
Brush	13	11	1,424	.85	110
All Upland	9,356	12,645	1,038,703	1.35	111
Stream (Hand)	1,216	1,431	101,141	1.18	83
All Types	10,572	14,076	1,139,844	1.33	108

TABLE 6

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1943
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	EQ-Emerg.	40,997	35,497	6,584,066	.87	161
	FS-Reg.	41,605	47,053	8,929,318	1.13	215
	FS-Emerg.	102,088	78,912	16,462,983	.77	161
	CCC	125,743	178,030	23,258,948	1.42	185
	Total	336,209	347,843	58,081,698	1.03	173
Second	EQ-Emerg.	42	44	5,151	1.05	123
	FS-Reg.	22,827	25,318	4,155,791	1.11	182
	FS-Emerg.	9,136	7,735	1,132,792	.85	124
	CCC	18,447	34,468	2,471,318	1.87	134
	Total	50,452	67,565	7,765,052	1.34	154
Third	FS-Reg.	6,004	6,322	700,253	1.05	117
	FS-Emerg.	487	250	24,398	.51	50
	CCC	4,081	7,504	415,193	1.84	102
	Total	10,572	14,076	1,139,844	1.33	108
All Workings	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	EQ-Emerg.	41,039	35,541	6,589,217	.87	161
	FS-Reg.	70,436	78,693	13,785,362	1.12	196
	FS-Emerg.	111,711	86,897	17,620,173	.78	158
	CCC	148,271	220,002	26,145,459	1.48	176
	Total	397,233	429,484	66,986,594	1.08	169

TABLE 7

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1943
COEUR D'ALENE OPERATION

Working	Number of Acres Worked				
	Federal	Other			Total
	National Forest	State	Private	Total	
First	315,400	5,659	15,150	20,809	336,209
Second	46,698	530	3,224	3,754	50,452
Third	9,479	200	893	1,093	10,572
All Workings	371,577	6,389	19,267	25,656	397,233

TABLE 8

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1927-1943
COEUR D'ALENE OPERATION

Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	315,400	32,302	347,702	10,303	358,005
Public Domain		2,110	2,110		2,110
Subtotal Federal	315,400	34,412	349,812	10,303	360,115
State	5,659	1,171	6,830		6,830
Private	15,150	8,349	23,499	5,151	28,650
Subtotal Other	20,809	9,520	30,329	5,151	35,480
Total	336,209	43,932	380,141	15,454	395,595

TABLE 9

TOTAL RIBES BY SPECIES ERADICATED, 1927-1943
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Cutover (Prior 1940)	11,914	3,050,950	1,352,046	1	17,536	27,585	4,448,118
	Burn (Prior 1940)	5,889	561,147	448,567		13,530	5,424	1,028,668
	Reproduction	84,512	11,820,946	7,362,253	2,227	506,494	101,381	19,793,301
	Pole	66,032	2,651,127	1,799,863	12,246	12,823	43,340	4,519,399
	Mature	141,857	11,053,700	2,917,046	1	89,402	150,522	14,210,671
	Brush	10,555	778,322	1,424,834		25,748	5,257	2,234,161
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	321,401	29,971,753	15,325,810	14,475	665,533	333,509	46,311,080
	Stream	14,808	7,251,355	183,261	31,474	4,236,141	68,387	11,770,618
	All Types	336,209	37,223,108	15,509,071	45,949	4,901,674	401,896	58,081,698
Second	Cutover (Prior 1940)	7,651	1,418,565	403,430		13,606	3,080	1,838,681
	Burn (Prior 1940)	1,251	411,432	172,419				583,851
	Reproduction	16,718	1,084,818	851,371		13,229	8,835	1,958,253
	Pole	5,801	477,739	124,199	4,736	3,882	565	611,121
	Mature	11,006	824,104	302,016		11,089	4,337	1,141,546
	Brush	584	12,099	97,997				110,096
	All Upland	43,011	4,228,757	1,951,432	4,736	41,806	16,817	6,243,548
	Stream	7,441	1,061,707	43,758		410,038	6,001	1,521,504
	All Types	50,452	5,290,464	1,995,190	4,736	451,844	22,818	7,765,052
Third	Cutover (Prior 1940)	4,260	504,214	81,745				585,959
	Burn (Prior 1940)	184	18,806	1,042				19,848
	Reproduction	2,174	132,771	73,916		1,067		207,754
	Pole	825	102,407	10,723				113,130
	Mature	1,900	95,813	14,775				110,588
	Brush	13	129	1,295				1,424
	All Upland	9,356	854,140	183,496		1,067		1,038,703
	Stream	1,216	73,144	113		27,884		101,141
	All Types	10,572	927,284	183,609		28,951		1,139,844
All Workings	Cutover (Prior 1940)	23,825	4,973,729	1,837,221	1	31,142	30,665	6,872,758
	Burn (Prior 1940)	7,324	991,385	622,028		13,530	5,424	1,632,367
	Reproduction	103,404	13,038,535	8,287,540	2,227	520,790	110,216	21,959,308
	Pole	72,658	3,231,273	1,934,785	16,982	16,705	43,905	5,243,650
	Mature	154,763	11,973,617	3,233,837	1	100,491	154,859	15,462,805
	Brush	11,152	790,550	1,524,126		25,748	5,257	2,345,681
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	373,768	35,054,650	17,460,738	19,211	708,406	350,326	53,593,331
	Stream	23,465	8,386,206	227,132	31,474	4,674,063	74,388	13,393,263
	All Types	397,233	43,440,856	17,687,870	50,685	5,382,469	424,714	66,986,594

BLISTER RUST CONTROL WORK, KANIKSU OPERATION, 1943

By

Harold A. Brischle, Technical Supervisor

The Kaniksu operation is comprised of the valuable stands of white pine pole and reproduction on an area approximately 4,300 square miles in Bonner and Boundary Counties of northern Idaho and Pend Oreille County in eastern Washington. Within this control operation are the lands of the Kaniksu National Forest, the Priest Lake Timber Protective Association, portions of the Pend Oreille Timber Protective Association, state and private lands. The work program consisted of five Forest Service camps varying in size from 25 to 60 men, and two Bureau cooperative camps financed on a cooperative basis between the Federal government, state of Idaho and the Priest Lake Timber Protective Association.

Two groups of Italian war internees were financed from Forest Service regular funds. One group of 25 under the supervision of a Forest Service foreman was a part of a 200-man camp which did other types of forestry work. A group of 38 working under the supervision of a Forest Service camp superintendent was established as an individual camp unit.

ORGANIZATION AND ADMINISTRATION

Kalispell Bay on Priest Lake served as field headquarters for the Forest Service and Bureau. Subsistence, supplies, equipment and men were dispatched from headquarters to the various camps. Transportation by boat and barge was used whenever possible. Deliveries to isolated camps were made by pack stock. Other camps were serviced by truck.

The field organization was as follows:

Bureau of Entomology and Plant Quarantine	U. S. Forest Service
H. A. Brischle, Technical Supervisor	H. A. Brischle, Technical Supervisor
L. J. Easley, Assistant Operation Supervisor	G. M. Houghton, Checker Foreman in charge of checking
Harry S. Peters, Assistant to Operation Supervisor	

Program	Number Camps	Number Workers	Number Checkers
EQ-Cooperative	2	95	2
FS-Regular	7*	263*	3

Total number of men employed on blister rust control - 373.

*Includes two groups of Italian war internees totaling 63 men.

The first camp was opened on May 11 and the last one on June 14. Most camps were closed by September 1. Due to the demands of the armed services, war industries, and the urgent need of farm help suitable labor was hard to obtain. The crews were all paid on a monthly basis. When the weather was too

wet for ribes eradication work the crews were used on road and trail maintenance, brush disposal, and other forest improvement work at the discretion of the district ranger. Rainy days were also utilized to a good advantage in training men for fire fighting, smoke chasing, and the proper use of tools.

The regular crews consisted largely of young boys of high school age. Some of these proved too immature for the work. It was found there was a vast difference between handling these young crews in large groups over other years when they worked with older boys and men. Homesickness, playfulness on the job, outright insubordination and outside influence from the parents were the greatest contributing factors for a large turnover in personnel. The boys who stayed through the season demonstrated their ability to perform good and efficient work despite their age and they will be a valuable source for personnel next year.

The supervisory overhead realizing the responsibility of working these young and inexperienced crews exercised care to promote safe methods and working conditions at all times. As a result only one lost-time accident was experienced on the operation during the entire season.

The regular crews covered 9,406 acres at the rate of 1.1 man-days per acre. The Italian internees covered 3,165 acres at the rate of .8 man-days per acre. The internees did a creditable job of ribes eradication. They were willing, conscientious, thorough in their work and proved to be satisfactory in all respects.

DESCRIPTION OF AREAS AND LOCATION OF WORK

The Bureau cooperative camps were located on Soldier and Bear Creeks on the Priest Lake Timber Protective Association area. Forest Service camps were located on Kalispell Creek, Kalispell Bay, Beaver Creek, Hellroaring Creek, and the Navigation camp on Upper Priest Lake. One group of Italian war internees worked areas in the vicinity of the Falls Ranger Station. On July 28, personnel in the camp at Navigation was replaced by 38 Italian war internees secured from the U. S. Immigration Service at Missoula, Montana. The internee crews worked on ribes eradication until September 20, after which they worked on canker elimination until late in October. In general, this work consisted of pruning approximately the lower third of the limbs without inspection for cankers. The remaining branches were then inspected and those infected were removed.

Bureau cooperative camps worked in the following townships and sections:

Soldier Creek Drainage - T. 60 N., R. 3 W., secs. 31, 32, 33 34
T. 60 N., R. 4 W., sec. 36

Bear Creek Drainage - T. 62 N., R. 4 W., secs. 35 and 36
T. 61 N., R. 4 W., secs. 2, 3, 10, 11, 14

Forest Service camps and Italian war internees did work in the following townships and sections:

Hellroaring Creek Drainage - T. 59 N., R. 2 W., secs. 4, 5, 6
T. 60 N., R. 2 W., secs. 31, 33

Kalispell Creek Drainage - T. 36 N., R. 45 E., secs. 9, 10, 11, 12, 13, 14, 15, 16, 19, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34.

Navigation Camp - (Includes FS-Regular and Italian war internees)
T. 63 N., R. 4 W., secs. 19, 30, 31, 32
T. 63 N., R. 5 W., secs. 24, 25

Diamond Peak Area - (Italian war internees)
T. 36 N., R. 45 E., secs. 9, 10, 11, 12

Lamb Creek Area - T. 35 N., R. 45 E., secs. 1, 2, 3, 11, 12
T. 36 N., R. 45 E., secs. 26, 34, 35, 36

Reynolds Creek (stream only) - T. 60 N., R. 5 W., secs. 12, 13

Beaver Creek Drainage - T. 62 N., R. 4 W., secs. 6, 7
T. 61 N., R. 5 W., secs. 1, 11, 12, 13, 14

Falls Ranger Station Area - (Italian war internees)
T. 58 N., R. 5 W., secs. 16, 17, 20, 21, 33, 34
T. 57 N., R. 5 W., secs. 4, 5, 6, 7, 8, 9, 13, 15, 16, 17
T. 32 N., R. 45 E., secs. 7, 18

All eradication work done was in stands of reproduction, pole, planted areas and streams adjacent to these stands. Difficult working conditions were experienced on several of the areas. In Beaver and Hellroaring Creeks ribes were both large and numerous. The terrain was steep and rugged and in general presented heavy working conditions. The Soldier Creek area was largely in third working. Ribes were numerous but small while the terrain was steep and rugged. Due to the small ribes it was hard to get the area worked to acceptable standards.

A small crew of 25 men working out of blister rust headquarters at Kalispell Bay worked out small scattered areas in the Lamb Creek drainage and in the vicinity of Gleason Mountain. This camp proved quite successful and was operated at an economical cost in connection with regular headquarters camp, cook and other facilities normally used only by a few headquarters personnel.

Work in the Kalispell Creek drainage was confined mostly to planted areas. Several small areas of first working in extremely heavy concentrations of ribes were worked in order to prevent the spread of the rust into the plantations.

METHODS AND EQUIPMENT

In general, standard methods were used. All older experienced men available and capable of supervising were used to help train the young and inexperienced crews. Italian crews were given a short story of blister rust and the objectives of the control work which was translated from English into Italian. Additional training was carried on by the foreman or camp superintendent through an interpreter. These men were all serious about the work and willing to cooperate. Training them for blister rust work did not present as much of a problem as was anticipated.

The loss of all of our experienced checkers to the armed forces was keenly felt on the operation. Men of suitable age, experience and background for checking were not available for replacements, and it was necessary to train several boys for checking who had only a year of eradication work. These boys were picked because of their ability to find ribes and in this respect they were as capable as most of our checkers in years past. Due to lack of experience they were not able to organize their work or prepare maps as well as checkers in the past, nor were they able to interpret to the camp boss the significance of some of their results. These deficiencies were partially offset by working them in groups under the direct supervision of the checker foreman who assisted with all the preparations of maps and compilation of data.

While the performance of these boys can in no way be compared to that of our checkers of other years they did gain one of the main objectives in that they were able to designate areas needing rework that would have otherwise been overlooked. A number of test check strips were run by the checker foreman and unit supervisor and in all cases the accuracy of the field work was substantiated.

CONTROL STATUS

Many mature areas of white pine on the operation have been logged in the past five years, thus changing the control status. Due to the lack of qualified checkers the field work necessary to bring these areas into the proper control status has not been done. It is estimated that of a total of 466,879 acres initially worked approximately 40 per cent or 186,750 acres are on a maintenance basis. It is further estimated 100,000 acres are in need of rework and 180,129 acres are up for post check.

The year 1941 seems to have been a very favorable year for the spread of the rust. Probably one of the big factors for this large spread was the wet foggy weather with favorable wind and temperature occurring late that summer and fall.

Several instances of relatively long spreads of rust from ribes to pine were observed. Notable among these was the spread of over a mile in distance from the Diamond Peak area to the Kalispell Creek Plantation. This heavy ribes concentration on Diamond Peak was removed this past season. It was left originally because of the heavy working conditions and expense that would be involved in eradication work. It was thought at that time the protection

strip surrounding the plantation was sufficient to keep the rust from spreading to the planted area. This patch of ribes, about forty acres in size, became heavily infected and in the past several years the production of telia has reached a tremendous volume. Due to the bareness of the plantation there are very few obstacles such as snags, brush and other tree species to shield and screen the planted white pine. Air currents and whirlwinds pass rapidly over the area. It is the opinion that in this instance the distance of spread is not governed alone by mere distance but by the rapidity with which air currents pass over the area.

CHECKING, PINE DISEASE SURVEY, AND CLASSIFICATION

Five men were used for checking on the operation at a checking cost of $0.155 per acre. Of the 12,571 acres worked only 288 acres were left unchecked. The check on the entire area, on which the eradication consisted of initial, second and third working, reveals six ribes and eight feet of live stem remaining per acre. Ninety-two per cent of the area checked was well within the acceptable checking standard. The remaining eight per cent contains live stem from 25 to 50 feet per acre.

A party of six men conducted a pine disease survey from September 4 to November 1. Seven main drainages were surveyed and 6,816 acres covered at a survey cost of $0.122 per acre. Thirty-three miles of survey strip were run.

All of the survey was made on stands of white pine reproduction and plantations. At the present time these stands are carrying from 300 to 2,400 trees per acre. The surveys undertaken were on areas worked in 1934, 1936, 1939 and 1941. They were worked by the CCC, ERA, EQ-Coop., and regular Forest Service employees. Thereby a cosmopolitan picture may be shown with correlated data for the last decade on the Kaniksu operation.

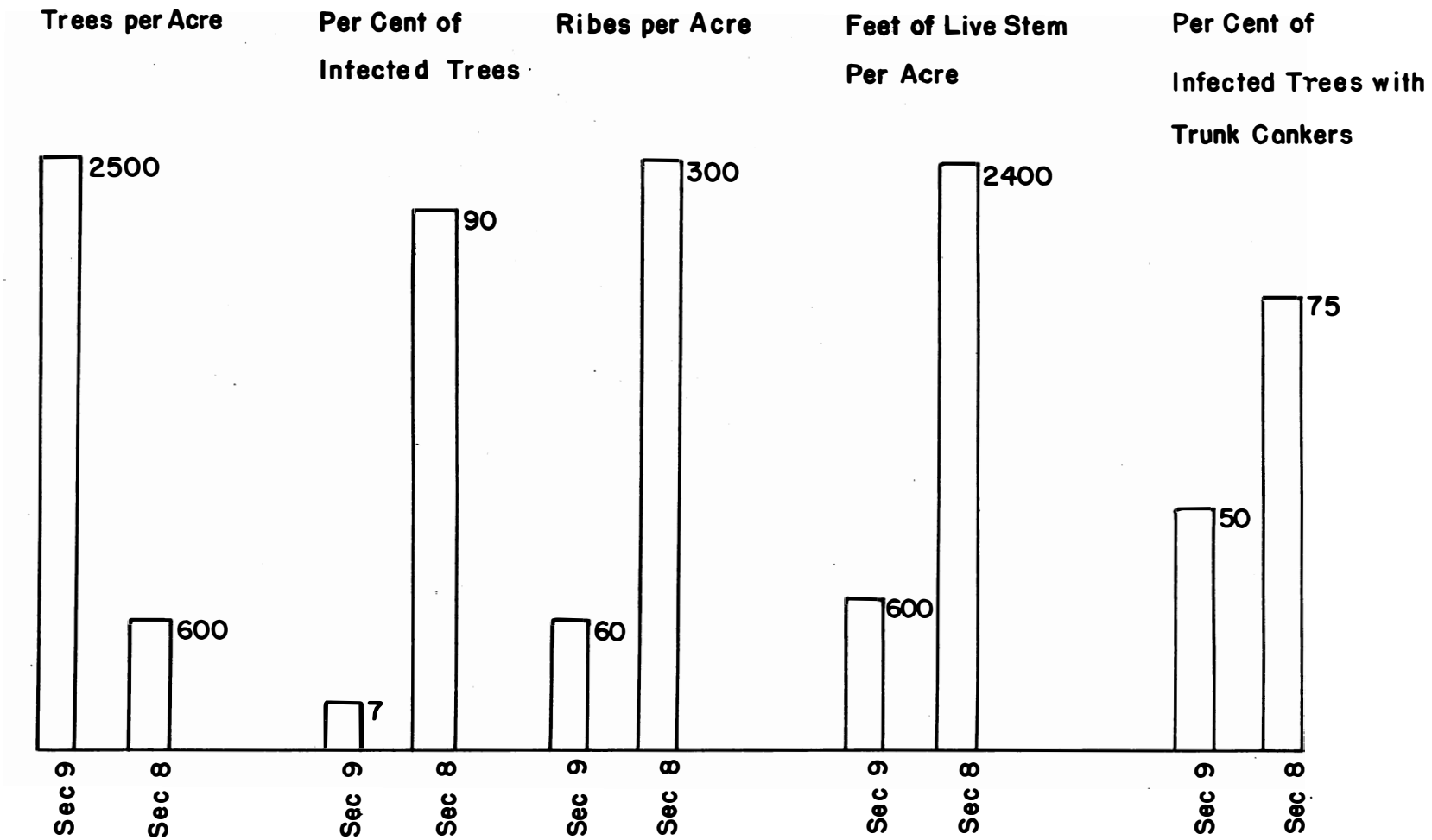
1943 Survey

Number of trees examined	18,681
Number of trees infected	2,498
Per cent of trees infected	13

It is noted there is a general increase in the spread of infection during the past seven years particularly on 1940 and 1941 wood. Sixty per cent of the infection found was located on the limbs of the pines. The increase in the spread of the infection is 12.3 per cent. On the other hand it must be noted there is considerable increase in white pine reproduction on these areas over the same period of time. The increase amounts to 128 trees per acre or a gain of 52 per cent.

One area in particular is listed for its striking comparison. It is the LaClerc Creek road area located in T. 36 N., R. 45 E., sections 8 and 9. Both areas are adjacent to each other and are identical as to slope, ridge and timber type. Section 9 was worked in 1934. Section 8 has never had any eradication work. The following graph shows the comparison.

The summaries of the survey results in other drainages are listed in another section.


Trees per Acre
2500
600
Per Cent of Infected Trees
7
90
Ribes per Acre
60
300
Feet of Live Stem Per Acre
600
2400
Per Cent of Infected Trees with Trunk Cankers
50
75
Sec 9
Sec 8
Sec 9
Sec 8
Sec 9
Sec 8
Sec 9
Sec 8
Sec 9
Sec 8

Big Creek Drainage - T. 57 N., R. 3, 4 W. Sections 1, 2, 5, 6, 12.

Chains of survey strip	330
Number of trees examined	2,000
Number of trees infected	507
Per cent of trees infected	25
Number of trees per acre	303
Per cent of infected trees with trunk cankers	67

Effects of pruning enter into this data. Survey shows 51 ribes with 138 feet of live stem per acre. Majority of cankers were found on 1939, 1940 and 1941 wood.

Tillicum Creek Drainage - T. 37 N., R. 45 E. Sections 2, 3, 4, 10.

Chains of survey strip	420
Number of trees examined	2,360
Number of trees infected	314
Per cent of trees infected	13
Number of trees per acre	1,405
Per cent of infected trees with trunk cankers	27

The 1943 survey was taken in late October and too late for accurate ribes data. The majority of the infection was on 1939, 1940 and 1941 wood.

Quartz Creek Drainage - T. 58 N., R. 5 W. Sections 36, 30, 29, 20, 19, 27, 35, 34, 26.
T. 57 N., R. 5 W. Sections 1, 2, 24.

Chains of survey strip	1,438
Number of trees examined	7,212
Number of trees infected	1,090
Per cent of trees infected	15
Number of trees per acre	251
Per cent of infected trees with trunk cankers	40

The 1943 survey shows 17 ribes with 435 feet of live stem remaining per acre. The majority of the cankers were on 1939, 1940 and 1941 wood.

Reynolds Creek Drainage - T. 60 N., R. 5 W. Sections 12 and 13

Chains of survey strip	40
Number of trees examined	160
Number of trees infected	4
Per cent of trees infected	3
Number of trees per acre	700
Per cent of infected trees with trunk cankers	25

Three of the infected trees were found adjacent to the stream. No ribes were found on the upland and none on the stream. The stream was worked in 1943.

LaClerc Creek Road Area - T. 36 N., R. 45 E. Section 9

Chains of survey strip	110
Number of trees examined	5,352
Number of trees infected	348
Per cent of trees infected	7
Number of trees per acre	2,171
Per cent of infected trees with trunk cankers	35

The 1943 survey shows 72 ribes with 604 feet of live stem remaining per acre. The majority of the cankers were on 1939, 1940 and 1941 wood. The majority of the trunk cankers were found on 1935 and 1937 wood.

Zero Creek Drainage - T. 62 N., R. 5 W. Sections 7, 8 and 17.

Chains of survey strip	260
Number of trees examined	1,597
Number of trees infected	236
Per cent of trees infected	15
Number of trees per acre	305
Per cent of infected trees with trunk cankers	65

The 1943 survey shows 9 ribes with 73 feet of live stem remaining per acre. The majority of the cankers were on 1939, 1940 and 1941 wood. The majority of the trunk cankers were on 1935 wood.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperating agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 5,408.75
	Regular BLR-3-4	31,008.76
	Subtotal	$ 36,417.51
State of Idaho and Priest Lake Timber Protective Assn.	State and Private BLR-3-4	$ 4,418.75
Forest Service	Regular BLR-4	$102,808.34
Total		$143,644.60

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
KANIKSU OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	Total
Sal. perm. men	$3,811.89			$ 3,811.89	$ 7,797.18	$ 11,609.07
Sal. temp. men	429.20	$ 6,327.36	$1,173.86	7,930.42	12,777.74	20,708.16
Wages, temp. labs.		19,020.51	2,492.37	21,512.88	63,708.78	85,221.66
Subs. supplies	65.89	4,682.19	752.52	5,500.60	11,778.87	17,279.47
Equipment	105.67	9.95		115.62	2,202.62	2,318.24
Trucks					1,321.91	1,321.91
Travel & transp.	487.18	453.88		941.06	1,844.48	2,785.54
Other Supplies	508.92	514.87		1,023.79	1,376.76	2,400.55
Total	$5,408.75	$31,008.76	$4,418.75	$40,836.26	$102,808.34	$143,644.60

SUMMARY OF RIBES ERADICATION, 1943
KANIKSU OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Cutover (Prior 1940)		1,294		1,294	1,034	93,253	7	13
Reproduction	1,974	5,358	1,955	9,287	9,378	882,195	6	5
Pole	250	970		1,220	1,345	22,830	4	6
Mature	158	256		414	219	3,889	2	3
All Upland	2,382	7,878	1,955	12,215	11,976	1,002,167	5	6
Stream (Hand)		108	248	356	512	26,386	2	7
All Types	2,382	7,986	2,203	12,571	12,488	1,028,553	5	6

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man-Days	Ribes	Bushes	Live Stem
Reproduction	1,974	2,381	322,061	1.21	163	4	12
Pole	250	124	3,557	.50	14	1	2
Mature	158	40	1,568	.25	10	3	6
All Types	2,382	2,545	327,186	1.07	137	4	11

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	1,294	1,034	93,253	.80	72	7	13
Reproduction	5,358	4,607	375,912	.86	70	5	6
Pole	970	1,221	19,273	1.26	20	5	7
Mature	256	179	2,321	.70	9	1	1
All Upland	7,878	7,041	490,759	.89	62	5	7
Stream (Hand)	108	161	7,471	1.49	69	3	4
All Types	7,986	7,202	498,230	.90	62	5	7

TABLE 3C - THIRD WORKING

Reproduction	1,955	2,390	184,222	1.22	94	8	8
Stream (Hand)	248	351	18,915	1.42	76	2	8
All Types	2,203	2,741	203,137	1.24	92	7	8

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
						Man-Days	Ribes	Bushes	Live Stem
Idaho	First	FS-Reg.	2,114	2,006	162,970	.95	77	4	11
	Second	EC-Coop.	1,332	1,655	103,846	1.24	78	4	5
		FS-Reg.	4,031	3,715	196,650	.92	49	3	9
		Total	5,363	5,370	300,496	1.00	56	4	8
	Third	EC-Coop.	856	1,309	58,909	1.53	69	8	13
		FS-Reg.	228	314	17,793	1.38	78	2	9
		Total	1,084	1,623	76,702	1.50	71	6	12
	All Workings	EC-Coop.	2,188	2,964	162,755	1.35	74	6	8
		FS-Reg.	6,373	6,035	377,413	.95	59	3	10
		Total	8,561	8,999	540,168	1.05	63	4	9
Washington	First	FS-Reg.	268	539	164,216	2.01	613	8	11
	Second	FS-Reg.	2,623	1,832	197,734	.70	75	8	5
	Third	FS-Reg.	1,119	1,118	126,435	1.00	113	9	6
	All Workings	FS-Reg.	4,010	3,489	488,385	.87	122	9	6
Idaho and Washington	First	FS-Reg.	2,382	2,545	327,186	1.07	137	4	11
	Second	EC-Coop.	1,332	1,655	103,846	1.24	78	4	5
		FS-Reg.	6,654	5,547	394,384	.83	59	5	8
		Total	7,986	7,202	498,230	.90	62	5	7
	Third	EC-Coop.	856	1,309	58,909	1.53	69	8	13
		FS-Reg.	1,347	1,432	144,228	1.06	107	7	7
		Total	2,203	2,741	203,137	1.24	92	7	9
	All Workings	EC-Coop.	2,188	2,964	162,755	1.35	74	6	8
		FS-Reg.	10,383	9,524	865,798	.92	83	5	8
		Total	12,571	12,488	1,028,553	.99	82	6	8

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943
KANIKSU OPERATION

State	Working	Number of Acres Worked														
		By Forest Service					By Bureau of Entomology and Plant Quarantine			Total						
										Federal			Other			
		National Forest	Public Domain	State	Private	Total	State	Private	Total	National Forest	Public Domain	Total	State	Private	Total	Total
Idaho	First	1,520	160	40	394	2,114				1,520	160	1,680	40	394	434	2,114
	Second	3,548		348	135	4,031	690	642	1,332	3,548		3,548	1,038	777	1,815	5,363
	Third	84			144	228	856		856	84		84	856	144	1,000	1,084
	Total	5,152	160	388	673	6,373	1,546	642	2,188	5,152	160	5,312	1,934	1,315	3,249	8,561
Washington	First	268				268				268		268				268
	Second	2,623				2,623				2,623		2,623				2,623
	Third	1,119				1,119				1,119		1,119				1,119
	Total	4,010				4,010				4,010		4,010				4,010
Total	First	1,788	160	40	394	2,382				1,788	160	1,948	40	394	434	2,382
	Second	6,171		348	135	6,654	690	642	1,332	6,171		6,171	1,038	777	1,815	7,986
	Third	1,203			144	1,347	856		856	1,203		1,203	856	144	1,000	2,203
	Total	9,162	160	388	673	10,383	1,546	642	2,188	9,162	160	9,322	1,934	1,315	3,249	12,571

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Reproduction	1,974	167,719	152,641	1,701	322,061
	Pole	250	959	2,598		3,557
	Mature	158	1,178	292	98	1,568
	All Types	2,382	169,856	155,531	1,799	327,186
Second	Cutover (Prior 1940)	1,294	44,783	45,025	3,445	93,253
	Reproduction	5,358	128,417	245,514	1,981	375,912
	Pole	970	6,789	12,484		19,273
	Mature	256	2,155	166		2,321
	All Upland	7,878	182,144	303,189	5,426	490,759
	Stream	108	6,952	365	154	7,471
	All Types	7,986	189,096	303,554	5,580	498,230
Third	Reproduction	1,955	60,340	123,882		184,222
	Stream	248	10,363	45	8,507	18,915
	All Types	2,203	70,703	123,927	8,507	203,137
All Workings	Cutover (Prior 1940)	1,294	44,783	45,025	3,445	93,253
	Reproduction	9,287	356,476	522,037	3,682	882,195
	Pole	1,220	7,748	15,082		22,830
	Mature	414	3,333	458	98	3,889
	All Upland	12,215	412,340	582,602	7,225	1,002,167
	Stream	356	17,315	410	8,661	26,386
	All Types	12,571	429,655	583,012	15,886	1,028,553

SUMMARY OF RIBES ERADICATION 1923-1943
KANIKSU OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes
Cutover (Prior 1940)	8,364	5,908	140	14,412	12,261	3,277,344
Burn (Prior 1940)	1,132			1,132	1,354	947,874
Reproduction	165,726	39,106	8,593	213,425	159,105	37,957,213
Pole	122,029	17,426	475	139,930	51,107	6,662,603
Mature	141,815	5,719	105	147,639	33,277	6,112,486
Brush	3,599	688	179	4,466	1,586	367,519
Subalpine	1,933	110		2,043	1,044	169,129
Meadow-Field	71	10		81	1	72
All Upland	444,669	68,967	9,492	523,128	259,735	55,494,240
Stream (Hand)	20,604	5,306	771	26,681	46,319	9,277,883
Stream (Mechanical)	1,606			1,606	12,075	902,076
All Stream	22,210	5,306	771	28,287	58,394	10,179,959
All Types	466,879	74,273	10,263	551,415	318,129	65,674,199

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Per Acre Basis Ribes
Cutover (Prior 1940)	8,364	4,712	1,420,271	.56	170
Burn (Prior 1940)	1,132	1,354	947,874	1.20	837
Reproduction	165,726	115,623	31,841,249	.70	192
Pole	122,029	42,516	6,020,274	.35	49
Mature	141,815	30,231	5,775,347	.21	41
Brush	3,599	1,104	336,107	.31	93
Subalpine	1,933	1,019	156,522	.53	81
Meadow-Field	71				
All Upland	444,669	196,559	46,497,644	.44	105
Stream (Hand)	20,604	36,802	8,257,111	1.79	401
Stream (Mechanical)	1,606	12,075	902,076	7.52	562
All Stream	22,210	48,877	9,159,187	2.20	412
All Types	466,879	245,436	55,656,831	.53	119

TABLE 7B - SECOND WORKING

Cutover (Prior 1940)	5,908	7,480	1,842,903	1.27	312
Reproduction	39,106	34,066	5,130,851	.87	131
Pole	17,426	8,405	622,400	.48	36
Mature	5,719	2,971	335,755	.52	59
Brush	688	360	28,386	.52	41
Subalpine	110	25	12,607	.23	115
Meadow-Field	10	1	72	.10	7
All Upland	68,967	53,308	7,972,974	.77	116
Stream (Hand)	5,306	8,595	967,025	1.62	182
All Types	74,273	61,903	8,939,999	.83	120

TABLE 7C - THIRD WORKING

Cutover (Prior 1940)	140	69	14,170	.49	101
Reproduction	8,593	9,416	985,113	1.10	115
Pole	475	186	19,929	.39	42
Mature	105	75	1,384	.71	13
Brush	179	122	3,026	.68	17
All Upland	9,492	9,868	1,023,622	1.04	108
Stream (Hand)	771	922	53,747	1.20	70
All Types	10,263	10,790	1,077,369	1.05	105

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS 1923-1943
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
						Man-Days	Ribes
Idaho	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	111,419	31,454	9,021,759	.28	81
		EQ-Emerg.	80,596	48,602	8,318,777	.60	103
		FS-Reg.	15,106	21,587	3,155,173	1.43	209
		FS-Emerg.	87,988	34,005	8,313,023	.39	94
		CCC	54,536	37,126	6,588,494	.68	121
		Total	368,441	179,618	36,465,915	.49	99
	Second	EQ-Coop.	8,971	7,336	911,681	.82	102
		EQ-Emerg.	14,537	14,806	2,637,381	1.03	184
		FS-Reg.	14,386	8,443	871,155	.59	61
		FS-Emerg.	11,281	4,818	475,451	.43	42
		CCC	7,883	13,352	1,863,341	1.69	236
		Total	56,858	48,755	6,759,009	.86	119
	Third	EQ-Coop.	2,487	2,757	420,615	1.11	169
		EQ-Emerg.	4,108	5,443	377,339	1.32	92
		FS-Reg.	1,724	904	67,202	.52	39
		Total	8,319	9,104	865,156	1.09	104
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	122,877	41,547	10,354,055	.34	84
		EQ-Emerg.	99,041	68,851	11,333,497	.70	114
		FS-Reg.	31,216	30,934	4,093,530	.99	131
		FS-Emerg.	99,269	38,823	8,788,474	.39	89
		CCC	62,419	50,478	8,451,835	.81	135
		Total	433,618	237,477	44,088,080	.55	102
Washington	First	EQ-Emerg.	30,061	17,555	6,539,175	.58	218
		FS-Reg.	14,219	14,129	5,540,841	.99	390
		FS-Emerg.	34,417	12,708	3,858,496	.37	112
		CCC	19,741	21,426	3,254,404	1.09	165
		Total	98,438	65,818	19,192,916	.67	195
	Second	EQ-Emerg.	1,376	1,381	204,383	1.00	149
		FS-Reg.	11,503	6,810	1,589,014	.59	138
		FS-Emerg.	1,949	1,678	154,764	.86	79
		CCC	2,587	3,279	232,829	1.27	90
		Total	17,415	13,148	2,180,990	.75	125
	Third	EQ-Emerg.	192	352	10,513	1.83	55
		FS-Reg.	1,752	1,334	201,700	.76	115
		Total	1,944	1,686	212,213	.87	109
	All Workings	EQ-Emerg.	31,629	19,288	6,754,071	.61	214
		FS-Reg.	27,474	22,273	7,331,555	.81	267
		FS-Emerg.	36,366	14,386	4,013,260	.40	110
		CCC	22,328	24,705	3,487,233	1.11	156
		Total	117,797	80,652	21,586,119	.68	183
Idaho and Washington	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop.	111,419	31,454	9,021,759	.28	81
		EQ-Emerg.	110,657	66,157	14,857,952	.60	134
		FS-Reg.	29,325	35,716	8,696,014	1.22	297
		FS-Emerg.	122,405	46,713	12,171,519	.38	99
		CCC	74,277	58,552	9,842,898	.79	133
		Total	466,879	245,436	55,656,831	.53	119
	Second	EQ-Coop.	8,971	7,336	911,681	.82	102
		EQ-Emerg.	15,713	16,187	2,841,764	1.03	181
		FS-Reg.	25,889	15,253	2,460,169	.59	95
		FS-Emerg.	13,230	6,496	630,215	.49	48
		CCC	10,470	16,631	2,096,170	1.59	200
		Total	74,273	61,903	8,939,999	.83	120
	Third	EQ-Coop.	2,487	2,757	420,615	1.11	169
		EQ-Emerg.	4,300	5,795	387,852	1.35	90
		FS-Reg.	3,476	2,238	268,902	.64	77
		Total	10,263	10,790	1,077,369	1.05	105
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		EQ-Coop	122,877	41,547	10,354,055	.34	84
		EQ-Emerg.	130,670	88,139	18,087,568	.67	138
		FS-Reg.	58,690	53,207	11,425,085	.91	195
		FS-Emerg.	135,635	53,209	12,801,734	.39	94
		CCC	84,747	75,183	11,939,068	.89	141
		Total	551,415	318,129	65,674,199	.58	119

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION 1923-1943
KANIKSU OPERATION

State	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	188,346	214	188,560	111,225	68,656	179,881	368,441
	Second	31,008		31,008	16,487	9,363	25,850	56,858
	Third	1,475		1,475	5,732	1,112	6,844	8,319
	Total	220,829	214	221,043	133,444	79,131	212,575	433,618
Washington	First	69,708		69,708	2,080	26,650	28,730	98,438
	Second	16,371		16,371		1,044	1,044	17,415
	Third	1,752		1,752		192	192	1,944
	Total	87,831		87,831	2,080	27,886	29,966	117,797
Idaho and Washington	First	258,054	214	258,268	113,305	95,306	208,611	466,879
	Second	47,379		47,379	16,487	10,407	26,894	74,273
	Third	3,227		3,227	5,732	1,304	7,036	10,263
	Total	308,660	214	308,874	135,524	107,017	242,541	551,415

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1943
KANIKSU OPERATION

State	Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	National Forest	188,346	40,337	228,683	26,202	254,885
	Public Domain	214	346	560		560
	Subtotal Federal	188,560	40,683	229,243	26,202	255,445
	State	111,225	17,215	128,440	30	128,470
	Private	68,656	43,664	112,320	5,390	117,710
	Subtotal Other	179,881	60,879	240,760	5,420	246,180
	Total	368,441	101,562	470,003	31,622	501,625
Washington	National Forest	69,708	29,602	99,310		99,310
	State	2,080	2,030	4,110		4,110
	Private	26,650	11,575	38,225		38,225
	Subtotal Other	28,730	13,605	42,335		42,335
	Total	98,438	43,207	141,645		141,645
Washington and Idaho	National Forest	258,054	69,939	327,993	26,202	354,195
	Public Domain	214	346	560		560
	Subtotal Federal	258,268	70,285	328,553	26,202	354,755
	State	113,305	19,245	132,550	30	132,580
	Private	95,306	55,239	150,545	5,390	155,935
	Subtotal Other	208,611	74,484	283,095	5,420	288,515
	Total	466,879	144,769	611,648	31,622	643,270

TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1943
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes By Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Cutover (Prior 1940)	8,364	558,257	817,010	45,004			1,420,271
	Burn (Prior 1940)	1,132	153,516	790,402	3,956			947,874
	Reproduction	165,726	9,507,659	22,104,541	226,102	2,947		31,841,249
	Pole	122,029	2,884,265	2,901,946	208,435	21,714	3,914	6,020,274
	Mature	141,815	4,004,358	1,614,403	154,559		2,027	5,775,347
	Brush	3,599	68,387	203,158	64,562			336,107
	Subalpine	1,933	116,392	40,111	19			156,522
	Meadow-Field	71						
	All Upland	444,669	17,292,834	28,471,571	702,637	24,661	5,941	46,497,644
	Stream	22,210	4,859,148	425,512	3,854,943		19,584	9,159,187
	All Types	466,879	22 15 .9	28,897,083	4 55 .58	24,661	25,525	55,656,831
Second	Cutover (Prior 1940)	5,908	570,658	1,258,397	13,848			1,842,903
	Reproduction	39,106	1,481,142	3,618,200	31,509			5,130,851
	Pole	17,426	301,920	309,337	11,143			622,400
	Mature	5,719	171,128	160,753	3,874			335,755
	Brush	688	16,170	11,341	875			28,386
	Subalpine	110	8,585	4,022				12,607
	Meadow-Field	10	72					72
	All Upland	68,967	2,549,675	5,362,050	61,249			7,972,974
	Stream	5,306	511,423	51,021	404,581			967,025
	All Types	74,273	3,061,098	5,413,071	465,830			8,939,999
Third	Cutover (Prior 1940)	140	5,481	3,688	5,001			14,170
	Reproduction	8,593	276,638	706,067	2,408			985,113
	Pole	475	6,278	13,526	125			19,929
	Mature	105	713	671				1,384
	Brush	179	1,109	1,893	24			3,026
	All Upland	9,492	290,219	725,845	7,558			1,023,623
	Stream	771	39,277	4,090	10,380			53,747
	All Types	10,263	329,496	729,935	17,938			1,077,369
All Workings	Cutover (Prior 1940)	14,412	1,134,396	2,079,095	63,853			3,277,344
	Burn (Prior 1940)	1,132	153,516	790,402	3,956			947,874
	Reproduction	213,425	11,265,439	26,428,808	260,019	2,947		37,957,213
	Pole	139,930	3,192,463	3,224,809	219,703	21,714	3,914	6,662,603
	Mature	147,639	4,176,199	1,775,827	158,433		2,027	6,112,486
	Brush	4,466	85,666	216,392	65,461			367,519
	Subalpine	2,043	124,977	44,133	19			169,129
	Meadow-Field	81	72					72
	All Upland	523,128	20,132,728	34,559,466	771,444	24,661	5,941	55,494,240
	Stream	28,287	5,409,848	480,623	4,269,904		19,584	10,179,959
	All Types	551,415	25,542,576	35,040,089	5,041,348	24,661	25,525	65,674,199

BLISTER RUST CONTROL WORK, MONTANA OPERATION, 1943

By
A. S. Skoglund, Technical Supervisor

INTRODUCTION

Blister rust control activities on the Montana operation were again confined to the Cabinet National Forest.

The personnel of the camps was composed almost entirely of boys 17 years of age and under, who were recruited from fourteen states and the District of Columbia. This nation-wide recruitment was very beneficial to the management and accomplishments of the camps. By and large the boys did satisfactory work and also earned themselves an enviable reputation on the large Buffalo, Wyoming fire. Another innovation was the successful employment of women cooks and flunkies to alleviate the man power shortage.

A total of 3,834 acres was worked in 1943 as compared to 2,540 acres in 1942 by approximately the same number of man-days. This brings the progress on the Montana operation to 128,482 acres worked initially and 13,619 acres reworked.

ORGANIZATION AND ADMINISTRATION

Three camps were operated on the Cabinet Forest with a peak employment of 132. Two 17 year old boys were selected and trained to perform all of the checking necessary to satisfactory operation of the camps.

The camps were administered and maintained by the Forest Service and technical supervision was provided by the Bureau of Entomology and Plant Quarantine. The field organization was directed by A. S. Skoglund.

The first camp was established May 12, and all were in operation by June 4. All of the camps were moved to new locations during the summer. Deep snow drifts on the high roads presented difficult installation and supply problems, yet all camps were in operation on schedule. The season was considerably shortened by the dispatch of two-thirds of the crew on August 6 to suppress the Buffalo, Wyoming fire. The first camp was closed on August 7 and the last one on September 8.

LOCATION AND DESCRIPTION OF AREAS

Work was performed on the Rock, Marten and Trout Creek areas of the Clark Fork River drainage.

The work on Trout Creek completed an area where ribes eradication work was started in 1934 but allowed to elapse until 1941 and 1942. The description of this 1910 burn area is contained in the previous reports. The Trout Creek work was performed in sections 28 and 33 of T. 24 N., R. 33 W.

First working was performed on the South Fork of Marten Creek. This area comprises a 1930 re-burn of a 1910 burn and subsequently was planted in 1931.

This is now a very thrifty plantation that has been supplemented by considerable stocking from natural sources. The area was relatively light in ribes except for one basin containing over 2,000 ribes per acre. Rust conditions are also light although at the confluence of McNeely Creek with the South Fork there was an area with considerable pine infection. This area was subsequently pruned to reduce the amount of aecia production and to salvage as much white pine as possible. The South Fork area work was in sections 1, 2, 10, 11, 12, 14, 15, 16, 21, 22 and 23 of T. 24 N., R. 33 W. A small amount of third working was performed in sections 20, 21 and 22 of T. 25 N., R. 33 W.

The greater part of the work on Rock Creek was confined to the stream type and stream zone areas. This area was logged in 1926 and has had various cedar sales since that time. A fine stand of white pine is now present with a relatively small amount of infection. The stream type working conditions are severe due to the large amount of cedar slash scattered practically over its entire length. Due to the Wyoming fire, one portion of the area was not worked and should receive first priority in 1944. The Rock Creek area work was in sections 3 and 4 of T. 25 N., R. 32 W., sections 2, 3, 4, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27 and 28 of T. 26 N., R. 32 W., and section 33 of T. 27 N., R. 32 W.

SURVEYS AND CONTROL STATUS

An intensive check was made of the transplant beds of Savenac Nursery in the fall of 1943. One hundred twenty-eight infected specimens were found in a check of 60,000 samples of 2-2 transplant stock sown in the fall of 1939 and transplanted in the spring of 1942. This represents .213 per cent infection. The pattern obtained by this survey is not of random distribution but similar to the pattern as obtained in seed beds where the per cent of infection varies directly with the distribution and density of the seedlings. It is too soon after the eradication of ribes from Haugan Lookout to determine what effect their removal had on the distribution of infection in the Nursery.

Extensive logging in the Troy unit of the Kootenai National Forest is rapidly changing the cover from one of mature timber and few ribes to that of seedling white pine and varying ribes conditions. The removal of these ribes must be accomplished at a time before any infection has an opportunity to develop. There is no visible infection in the south fork of Keeler Creek, consequently the removal of ribes in the new cuttings may be postponed until the drainage has been logged and necessary sanitation work performed. In the Star Creek area the blister rust program should be coordinated with the management plans for the disposition of the cedar. Rust is gradually but steadily developing in the Spar Lake vicinity which is located near the heavy Ross Creek center and therefore should receive high priority in the planning of the program for next season.

The Bull River unit of the Cabinet Forest contains a large percentage of pole size white pine with varying stages of rust development. The infection in Star Gulch has intensified on the fringes of the control area and in several places has spread somewhat into the stand itself. Blister rust has

been found in Carmichael Gulch and can be expected to intensify if immediate action is not forthcoming.

The Canyon Creek Plantation unit was dropped from the control area because the rust has developed so rapidly and eradication costs would be excessive.

The White Pine Creek area was reduced in size because of insufficient stocking and high costs. The adjusted area contains a thrifty stand of planted white pine supplemented by natural restocking with light ribes and practically no infection. Working of this area may be postponed for several years.

The St. Regis River unit of the Cabinet Forest is both pathologically and ecologically the most difficult unit in the control of blister rust in the state of Montana. Yet, despite this situation, fine stands are developing and should continue to develop if we are cognizant of the situation and adjust the plans accordingly.

Pruning work is recommended for the West Fork of Big Creek due to the mass introduction of rust in 1937 and 1938. Also the protection zone around the Middle Fork plantation area should be extended to prevent the filtering of spores into the plantation from the ribes on the higher slopes.

Of the area worked this past season 1,660 acres are on maintenance, 1,906 acres on post check and 268 acres on rework.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs by cooperative agency and type of appropriation is shown in the following tabulations:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
MONTANA OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 2,480.46
Forest Service	Regular BLR-4	42,200.99
Total		$44,681.45

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
MONTANA OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal., perm. men	$2,249.27	$ 2,845.10	$ 5,094.37
Wages, temp. labs.		29,338.71	29,338.71
Subs. supplies		7,301.74	7,301.74
Equipment		1,296.59	1,296.59
Travel and transp.	231.19	639.42	639.42
Other supplies		779.43	1,010.62
Total	$2,480.46	$42,200.99	$44,681.45

Two pictures showing growth on planted white pine pruned to two-fifths height of tree to eliminate damage from blister rust cankers. The plantation was established in 1926.

W-71. Taken 1941, one growing season after pruning.

W-71-1. Taken 1943, three growing seasons after pruning.

SUMMARY OF RIBES ERADICATION, 1943
MONTANA OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
								Bushes	Live Stem
Cabinet	Reproduction	1,471	320	389	2,180	2,998	298,753	1.0	3.1
	Pole	427			427	4			
	Brush	789			789	31	590	1.0	9.0
	All Upland	2,687	320	389	3,396	3,033	299,343	1.0	3.8
	Stream (Hand)	56	382		438	686	40,024		
	All Types	2,743	702	389	3,834	3,719	339,367		

TABLE 3A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
					Man-Days	Ribes	Bushes	Live Stem
Cabinet	Reproduction	1,471	2,224	272,860	1.51	185	1.0	3.7
	Pole	427	4		.01			
	Brush	789	31	590	.04	1	1.0	9.0
	All Upland	2,687	2,259	273,450	.84	102	1.0	4.3
	Stream (Hand)	56	100	23,419	1.79	418		
	All Types	2,743	2,359	296,869	.86	108		
TABLE 3B - SECOND WORKING								
Cabinet	Reproduction	320	637	21,189	1.99	66	1.0	1.0
	Stream (Hand)	382	586	16,605	1.53	43		
	All Types	702	1,223	37,794	1.74	54		
TABLE 3C - THIRD WORKING								
Cabinet	Reproduction	389	137	4,704	.35	12		

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943
MONTANA OPERATION

Forest	Working	Number of Acres Worked by Forest Service		
		National Forest	Private	Total
Cabinet	First	2,487	256	2,743
	Second	531	171	702
	Third	389		389
	Total	3,407	427	3,834

TABLE 5

TOTAL RIBES BY SPECIES ERADICATED, 1943
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Reproduction	1,471	204,814	68,046		272,860
	Pole	427				
	Brush	789	210	380		590
	All Upland	2,687	205,024	68,426		273,450
	Stream	56	12,964	55	10,400	23,419
	All Types	2,743	217,988	68,481	10,400	296,869
Second	Reproduction	320	17,165	4,024		21,189
	Stream	382	14,978	1,627		16,605
	All Types	702	32,143	5,651		37,794
Third	Reproduction	389	1,736	2,968		4,704
All Workings	Reproduction	2,180	223,715	75,038		298,753
	Pole	427				
	Brush	789	210	380		590
	All Upland	3,396	223,925	75,418		299,343
	Stream	438	27,942	1,682	10,400	40,024
	All Types	3,834	251,867	77,100	10,400	339,367

SUMMARY OF RIBES ERADICATION, 1928-1943
MONTANA OPERATION

TABLE 6 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Kootenai	Burn (Prior 1940)	115			115	1	32	
	Reproduction	12,504	341		12,845	8,783	1,101,839	
	Pole	18,884	779		19,663	7,830	851,971	
	Mature	16,427			16,427	3,539	481,919	
	Brush	235			235	94	7,956	
	Meadow-Field	103			103	1		
	All Upland	48,268	1,120		49,388	20,248	2,443,717	
	Stream (Hand)	3,050	533		3,583	8,982	1,277,034	
	All Types	51,318	1,653		52,971	29,230	3,720,751	
Cabinet	Reproduction	29,229	4,990	1,092	35,311	36,524	6,346,969	
	Pole	24,061	783	50	24,894	10,001	1,837,428	
	Mature	9,297	12		9,309	4,462	1,065,784	
	Brush	4,270			4,270	2,075	584,273	
	Meadow-Field	348			348	150	12,131	
	All Upland	67,205	5,785	1,142	74,132	53,212	9,846,585	
	Stream (Hand)	3,773	1,385	351	5,509	13,585	3,057,533	
	Stream (Chemical)	465	116	12	593	1,604	108,762	36,254
	Stream (Mechanical)	98			98	859	51,000	
	All Stream	3,871	1,385	351	5,607	16,048	3,217,295	
	All Types	71,076	7,170	1,493	79,739	69,260	13,063,880	
Savenac Nursery	Reproduction	5,000	179	85	5,264	1,944	559,902	
	Stream (Hand)	1,043	984	2,000	4,027	4,249	730,520	
	Stream (Chemical)	239	62		301	880	200,801	36,262
	Stream (Mechanical)	45	15	40	100	846	45,500	
	All Stream	1,088	999	2,040	4,127	5,975	976,821	
	All Types	6,088	1,178	2,125	9,391	7,919	1,536,723	
All Forests	Burn (Prior 1940)	115			115	1	32	
	Reproduction	46,733	5,510	1,177	53,420	47,251	8,008,710	
	Pole	42,945	1,562	50	44,557	17,831	2,689,399	
	Mature	25,724	12		25,736	8,001	1,547,703	
	Brush	4,505			4,505	2,169	592,229	
	Meadow-Field	451			451	151	12,131	
	All Upland	120,473	7,084	1,227	128,784	75,404	12,850,204	
	Stream (Hand)	7,866	2,902	2,351	13,119	26,816	5,065,087	
	Stream (Chemical)	704	178	12	894	2,484	309,563	72,516
	Stream (Mechanical)	143	15	40	198	1,705	96,500	
	All Stream	8,009	2,917	2,391	13,317	31,005	5,471,150	
	All Types	128,482	10,001	3,618	142,101	106,409	18,321,354	

TABLE 6A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days	Ribes	Gallons Spray
Kootenai	Burn (Prior 1940)	115	1	32		.01	1	
	Reproduction	12,504	8,618	1,076,317		.69	86	
	Pole	18,884	7,223	811,481		.38	43	
	Mature	16,427	3,539	481,919		.22	29	
	Brush	235	94	7,956		.40	34	
	Meadow-Field	103	1			.01		
	All Upland	48,268	19,476	2,377,705		.40	49	
	Stream (Hand)	3,050	8,177	1,214,159		2.68	398	
	All Types	51,318	27,653	3,591,864		.54	70	
Cabinet	Reproduction	29,229	28,901	5,573,111		.99	191	
	Pole	24,061	9,152	1,742,087		.38	72	
	Mature	9,297	4,447	1,064,328		.48	114	
	Brush	4,270	2,075	584,273		.49	137	
	Meadow-Field	348	150	12,131		.43	35	
	All Upland	67,205	44,725	8,975,930		.67	134	
	Stream (Hand)	3,773	10,829	2,851,458		2.87	756	
	Stream (Chemical)	465	1,180	77,079	25,693	2.54	166	55
	Stream (Mechanical)	98	859	51,000		8.77	520	
	All Stream	3,871	12,868	2,979,537		3.32	770	
	All Types	71,076	57,593	11,955,467		.81	168	
Savenac Nursery	Reproduction	5,000	1,688	521,650		.34	104	
	Stream (Hand)	1,043	1,710	372,268		1.64	357	
	Stream (Chemical)	239	777	188,401	32,132	3.25	788	134
	Stream (Mechanical)	45	168	22,500		3.73	500	
	All Stream	1,088	2,655	583,169		2.44	536	
	All Types	6,088	4,343	1,104,819		.71	181	
All Forests	Burn (Prior 1940)	115	1	32		.01	1	
	Reproduction	46,733	39,207	7,171,078		.84	153	
	Pole	42,945	16,375	2,553,568		.38	59	
	Mature	25,724	7,986	1,546,247		.31	60	
	Brush	4,505	2,169	592,229		.48	131	
	Meadow-Field	451	151	12,131		.33	27	
	All Upland	120,473	65,889	11,875,285		.55	99	
	Stream (Hand)	7,866	20,716	4,437,885		2.63	564	
	Stream (Chemical)	704	1,957	265,480	57,825	2.78	377	82
	Stream (Mechanical)	143	1,027	73,500		7.18	514	
	All Stream	8,009	23,700	4,776,865		2.96	596	
	All Types	128,482	89,589	16,652,150		.70	130	

TABLE 6B - SECOND WORKING

Kootenai	Reproduction	341	165	25,522		.48	75	
	Pole	779	607	40,490		.78	52	
	All Upland	1,120	772	66,012		.69	59	
	Stream (Hand)	533	805	62,875		1.51	118	
	All Types	1,653	1,577	128,887		.95	78	
Cabinet	Reproduction	4,990	6,717	696,283		1.35	140	
	Pole	783	750	89,475		.96	114	
	Mature	12	15	1,456		1.25	121	
	All Upland	5,785	7,482	787,214		1.29	136	
	Stream (Hand)	1,385	2,430	168,214		1.75	121	
	Stream (Chemical)	116	276	21,048	7,016	2.38	181	60
	All Stream	1,385	2,706	189,262		1.95	137	
	All Types	7,170	10,188	976,476		1.42	136	
Savenac Nursery	Reproduction	179	186	34,173		1.04	191	
	Stream (Hand)	984	1,018	294,673		1.03	299	
	Stream (Chemical)	62	103	12,400	4,130	1.66	200	67
	Stream (Mechanical	15	36	3,000		2.40	200	
	All Stream	999	1,157	310,073		1.16	310	
	All Types	1,178	1,343	344,246		1.14	292	
All Forests	Reproduction	5,510	7,068	755,978		1.28	137	
	Pole	1,562	1,357	129,965		.87	83	
	Mature	12	15	1,456		1.25	121	
	All Upland	7,084	8,440	887,399		1.19	125	
	Stream (Hand)	2,902	4,253	525,762		1.47	181	
	Stream (Chemical)	178	379	33,448	11,146	2.13	188	63
	Stream (Mechanical)	15	36	3,000		2.40	200	
	All Stream	2,917	4,668	562,210		1.60	193	
	All Types	10,001	13,108	1,449,609		1.31	145	

TABLE 6C - THIRD WORKING

Cabinet	Reproduction	1,092	906	77,575		.83	71	
	Pole	50	99	5,866		1.98	117	
	All Upland	1,142	1,005	83,441		.88	73	
	Stream (Hand)	351	326	37,861		.93	108	
	Stream (Chemical)	12	148	10,635	3,545	12.33	886	295
	All Stream	351	474	48,496		1.35	138	
	All Types	1,493	1,479	131,937		.99	88	
Savenac Nursery	Reproduction	86	70	4,079		.82	48	
	Stream (Hand)	2,000	1,521	63,579		.76	32	
	Stream (Mechanical)	40	642	20,000		16.05	500	
	All Stream	2,040	2,163	83,579		1.06	41	
	All Types	2,126	2,233	87,658		1.05	41	
All Forests	Reproduction	1,177	976	81,654		.83	69	
	Pole	50	99	5,866		1.98	117	
	All Upland	1,227	1,075	87,520		.88	71	
	Stream (Hand)	2,351	1,847	101,440		.79	43	
	Stream (Chemical)	12	148	10,635	3,545	12.33	886	295
	Stream (Mechanical)	40	642	20,000		16.05	500	
	All Stream	2,391	2,637	132,075		1.10	55	
	All Types	3,618	3,712	219,595		1.03	61	

TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1943
MONTANA OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man-Days	Ribes	Gallons Per Sprayed Area
First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334	148
	EQ-Emerg.	64,086	28,413	5,450,738	1,330	.44	85	44
	FS-Reg.	15,779	15,690	2,284,611	2,452	.99	145	54
	FS-Emerg.	33,462	33,088	7,157,633	20,598	.99	214	55
	CCC	13,772	10,083	1,296,868	2,780	.73	94	59
	Total	128,482	89,589	16,652,150	57,825	.70	130	82
Second	EQ-Reg.	619	980	299,410	4,130	1.58	484	67
	EQ-Emerg.	1,342	1,597	265,637		1.19	198	
	FS-Reg.	5,262	5,893	517,114	5,976	1.12	98	62
	FS-Emerg.	2,100	2,464	204,021	1,040	1.17	97	52
	CCC	678	2,174	163,427		3.21	241	
	Total	10,001	13,108	1,449,609	11,146	1.31	145	63
Third	EQ-Emerg.	648	777	59,040		1.20	91	
	FS-Reg.	2,795	2,684	142,772		.96	51	
	FS-Emerg.	150	68	6,069		.45	40	
	CCC	25	183	11,714	3,545	7.32	469	295
	Total	3,618	3,712	219,595	3,545	1.03	61	295
All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380	129
	EQ-Emerg.	66,076	30,787	5,775,415	1,330	.47	87	44
	FS-Reg.	23,836	24,267	2,944,497	8,428	1.02	124	60
	FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206	55
	CCC	14,475	12,440	1,472,009	6,325	.86	102	107
	Total	142,101	106,409	18,321,354	72,516	.75	129	81

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1943
MONTANA OPERATION

Forest	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Kootenai	First	46,781		46,781		4,537	4,537	51,318
	Second	1,165		1,165		488	488	1,653
	Total	47,946		47,946		5,025	5,025	52,971
Cabinet	First	61,934	40	61,974	734	14,456	15,190	77,164
	Second	6,779		6,779	1	1,568	1,569	8,348
	Third	2,244		2,244		1,374	1,374	3,618
	Total	70,957	40	70,997	735	17,398	18,133	89,130
All Forests	First	108,715	40	108,755	734	18,993	19,727	128,482
	Second	7,944		7,944	1	2,056	2,057	10,001
	Third	2,244		2,244		1,374	1,374	3,618
	Total	118,903	40	118,943	735	22,423	23,158	142,101

TABLE 9

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1928-1943
MONTANA OPERATION

Forest	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Kootenai	National Forest	46,781	25,680	72,461	14,434	86,895
	State		234	234		234
	Private	4,537	5,749	10,286	2,490	12,776
	Subtotal Other	4,537	5,983	10,520	2,490	13,010
	Total	51,318	31,663	82,981	16,924	99,905
Cabinet	National Forest	61,934	12,020	73,954	3,034	76,988
	Public Domain	40		40		40
	Subtotal Federal	61,974	12,020	73,994	3,034	77,028
	State	734		734		734
	Private	14,456	8,617	23,073		23,073
	Subtotal Other	15,190	8,617	23,807		23,807
	Total	77,164	20,637	97,801	3,034	100,835
All Forests	National Forest	108,715	37,700	146,415	17,468	163,883
	Public Domain	40		40		40
	Subtotal Federal	108,755	37,700	146,455	17,468	163,923
	State	734	234	968		968
	Private	18,993	14,366	33,359	2,490	35,849
	Subtotal Other	19,727	14,600	34,327	2,490	36,817
	Total	128,482	52,300	180,782	19,958	200,740

TABLE 10

TOTAL RIBES BY SPECIES ERADICATED, 1928-1943
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Burn (Prior 1940)	115	32							32
	Reproduction	46,733	3,354,122	3,637,271	4,714	55,569	114,802	3,455	1,145	7,171,078
	Pole	42,945	1,425,435	942,390	200	101,205	84,338			2,553,568
	Mature	25,724	1,341,526	177,396	259	11,080	8,729	7,257		1,546,247
	Brush	4,505	286,619	295,188		5,260	5,162			592,229
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	120,473	6,412,744	5,052,245	5,173	180,235	213,031	10,712	1,145	11,875,285
	Stream	8,009	3,039,280	118,153	266,006	1,294,654	5,744	31,905	21,123	4,776,865
	All Types	128,482	9,452,024	5,170,398	271,179	1,474,889	218,775	42,617	22,268	16,652,150
Second	Reproduction	5,510	446,406	286,787	4,860	4,668	10,666		2,591	755,978
	Pole	1,562	98,222	24,284	119	6,419	921			129,965
	Mature	12	1,456							1,456
	All Upland	7,084	546,084	311,071	4,979	11,087	11,587		2,591	887,399
	Stream	2,917	166,197	4,913	48,208	324,083	10,975		7,834	562,210
	All Types	10,001	712,281	315,984	53,187	335,170	22,562		10,425	1,449,609
Third	Reproduction	1,177	47,600	33,647	93		200		114	81,654
	Pole	50	800	5,060			6			5,866
	All Upland	1,227	48,400	38,707	93		206		114	87,520
	Stream	2,391	17,832	339	35,905	62,257			15,742	132,075
	All Types	3,618	66,232	39,046	35,998	62,257	206		15,856	219,595
All Workings	Burn (Prior 1940)	115	32							32
	Reproduction	53,420	3,848,128	3,957,705	9,667	60,237	125,668	3,455	3,850	8,008,710
	Pole	44,557	1,524,457	971,734	319	107,624	85,265			2,689,399
	Mature	25,736	1,342,982	177,396	259	11,080	8,729	7,257		1,547,703
	Brush	4,505	286,619	295,188		5,260	5,162			592,229
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	128,784	7,007,228	5,402,023	10,245	191,322	224,824	10,712	3,850	12,850,204
	Stream	13,317	3,223,309	123,405	350,119	1,680,994	16,719	31,905	44,699	5,471,150
	All Types	142,101	10,230,537	5,525,428	360,364	1,872,316	241,543	42,617	48,549	18,321,354

BLISTER RUST CONTROL
MOUNT RAINIER NATIONAL PARK, 1943

By
M. C. Riley, Technical Supervisor

White pine blister rust control work on Mount Rainier National Park during the 1943 field season was financed with regular funds and was conducted by one crew which consisted of a maximum of 40 men, all of whom were inexperienced in the work. The entire season from June 7 to August 28 was spent working on the Silver Forest portion of the Longmire area. During the month of June less than one half the time of the crew was spent on blister rust control work because of rainy weather. During inclement weather the crew was used on work better suited to the conditions and this aided materially in reducing labor turnover. The work was supervised by an experienced foreman and an assistant.

Ribes eradication consisted entirely of third working and was performed on stream type along the Nisqually River and its tributaries from a point approximately one-half mile above Longmire to the limits of the ribes zone, along Paradise Creek and its tributaries from the mouth to a short distance above Narada Falls and in pole type in the Silver Forest north and east of Canyon Rim. This area lies in unsurveyed sections 15, 22, 23, 28, T. 15 N., R. 8 E. Willamette Meridian. It had been planned that the crew would move to White River during the latter part of the season but the entire season was needed to complete the programmed work at Longmire. This was due in part to slow progress during June because of inclement weather, but principally because more ribes were encountered than had been anticipated. On some of the stream type there was a more serious seedling problem than had been experienced previously and a particularly troublesome patch of ground in the pole type which had been worked under the CCC program delayed completion of the job beyond what had been estimated.

Since work started on these areas in 1930, there has naturally been considerable change in silvicultural and ecological conditions. The natural growth of the trees where the stocking is sufficient tends to close the canopy to such an extent that further ribes germination is retarded and there is relatively little tendency for either an increase or a decrease in the number of bushes present. This condition now prevails on a considerable portion of the Longmire-Silver Forest area and as a result the type designations have been changed from reproduction to pole in the progress tables. This same condition also applies to other areas within the Park; and when the next working is done there, the same changes in type designation will be made.

In addition to the ribes eradication work, canker elimination was performed during the latter part of the field season. First coverage was completed at Longmire, and the Silver Forest was worked from Ricksacker Point to a considerable distance beyond Canyon Rim. Canker elimination was done on 196 acres and required 149 man-days. This resulted in the inspection of 7,795 white pine trees of which 3,151 were infected and from these infected trees 15,102 cankers were removed. It is estimated that less than 10 per cent of this infection originated since second working was completed on the areas.

Infection was found to be heavier in the Silver Forest than at Longmire but the above figures are not necessarily representative of general infection conditions since work was only done where noticeable infection occurred and there is considerable area where there is no blister rust.

No regular strip checks were run on the area worked this year because no checker was available. The foreman and his assistant were able to furnish enough close supervision so that it is felt a satisfactory quality of work was performed.

The ribes eradication accomplished this season did not materially affect the over-all control status figures for the Park since a major portion of the acreage covered was in stream type which will undoubtedly need further working. In the pole type worked this year so many ribes were removed that it is expected another working will be necessary.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work. Because of other assignments it was not possible for him to devote as much time as was desired or as had been possible in other years. The Bureau also supplied the necessary forms, maps and supplies for the proper recording and reporting of data.

RECOMMENDATIONS

For the 1944 field season a crew of 30 men should be employed. The majority of the time should be spent on the White River area, doing ribes eradication on parts of areas near Sunrise Point which were worked in 1941 and in doing canker elimination work near Shadow Lake, as well as reworking the area from which cankers were removed in 1941. This should result in the removal of practically all of the infection which has developed since the last working. It is likely that, in order to take advantage of labor as soon as schools are closed, it will be necessary to start operations on the Longmire area prior to the time working conditions are favorable at White River.

RESULTS

The following tables show statements of expenditures, results of the 1943 field work and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 451.73
National Park Service	Regular BLR-5	14,937.34
Total		$15,389.07

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
MOUNT RAINIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine Regular BLR-1-4	National Park Service Regular BLR-5	Total
Sal. perm. men	$370.58		$ 370.58
Personal services		$14,681.47	14,681.47
Travel and transp.	81.15		81.15
Contractual services		240.35	240.35
Supplies and material		15.52	15.52
Total	$451.73	$14,937.34	$15,389.07

TABLE 3

SUMMARY OF RIBES ERADICATION, 1943
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes bracteosum	Ribes laxiflorum	Ribes acerifolium		Man-Days	Ribes
Longmire	Third	Pole	140	671	4,109	202	21	13,786	18,118	4.79	129
		Stream	285	699	25,617	5,748	1,100	455	32,920	2.45	116
		Total	425	1,370	29,726	5,950	1,121	14,241	51,038	3.22	120

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1943
MOUNT RAINIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	2,647	3,806	780,171	1.44	295
	NP-CCC	5,607	6,264	860,336	1.12	154
	Total	8,254	10,070	1,640,507	1.22	199
Second	NP-Reg.	766	569	19,395	.74	25
	NP-CCC	4,262	5,372	381,518	1.26	90
	Total	5,028	5,941	400,913	1.18	80
Third	NP-Reg.	3,278	3,223	93,949	.98	29
	NP-CCC	1,091	1,056	51,313	.97	47
	Total	4,369	4,279	145,262	.98	33
All Workings	NP-Reg.	6,691	7,598	893,515	1.14	134
	NP-CCC	10,960	12,692	1,293,167	1.16	118
	Total	17,651	20,290	2,186,682	1.15	124

TABLE 5

SUMMARY OF RIBES ERADICATION, 1930-1943
MOUNT RAINIER NATIONAL PARK

Working	Area	Eradication Type	Acres	Effective Man-Days	Ribes by Species								Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes visco.	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triste		Man-Days	Ribes
First	Longmire	Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192
		Stream	626	1,202	185,697		97,774		53,899	2,838	16		340,214	1.92	543
		All Types	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.78	436
	Stevens Canyon	Reproduction	2,351	218	28,071		15,986				7,915		51,972	.09	22
		Pole	704	38	176		1,052				16		1,244	.05	2
		All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17
		Stream	1,192	4,741	72,360	2,055	440,386		914	11	3,959		519,685	3.98	436
		All Types	4,247	4,997	100,607	2,055	457,424		914	11	11,890		572,901	1.18	135
	White River	Reproduction	66	50	6,869	239	21	1,133	550	194			9,006	.76	136
		Pole	1,870	2,087	173,790	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		All Upland	2,258	2,401	207,976	82,615	560	140,371	1,744	11,040	91	744	445,141	1.06	197
		Stream	423	744	162,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422
		All Types	2,681	3,145	370,832	84,125	5,429	140,613	10,564	11,228	189	752	623,732	1.17	233
	Starbo	Reproduction	48	21	68	7		7		2,305			2,387	.44	50
		Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133
		All Upland	380	283	11,344	6,138		6,730	3,221	18,963			46,396	.74	122
		Stream	46	46	2,563	575		476	546	409			4,669	1.00	102
		All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120
	All Areas	Reproduction	2,739	686	75,289	246	17,108	1,140	5,959	8,303	7,915		115,960	.25	42
		Pole	2,906	2,387	185,232	75,660	1,591	145,961	4,410	27,459	107	744	441,164	.82	152
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		All Upland	5,967	3,337	287,848	88,753	18,699	147,101	10,374	35,807	8,022	744	597,348	.56	100
		Stream	2,287	6,733	423,566	4,140	543,029	718	64,179	3,446	4,073	8	1,043,159	2.94	456
		All Types	8,254	10,070	711,414	92,893	561,728	147,819	74,553	39,253	12,095	752	1,640,507	1.22	199
Second	Longmire	Reproduction	274	271	10,961		1,136			1,462			13,559	.99	49
		Stream	614	526	19,977		23,196		2,394	1,426	50		47,043	.86	77
		All Types	888	797	30,938		24,332		2,394	2,888	50		60,602	.90	68
	Stevens Canyon	Stream	787	2,532	49,131	95	171,224				607		221,057	3.22	281
	White River	Reproduction	66	12	221			77					298	.18	5
		Pole	2,194	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.81	37
		Mature	328	47	1,278	2,011							3,289	.15	10
		All Upland	2,582	1,827	37,783	16,315	2,176	6,941	16,224	4,537			83,976	.71	33
		Stream	394	657	32,748		154		5				32,907	1.67	84
		All Types	2,976	2,484	70,531	16,315	2,330	6,941	16,229	4,537			116,883	.83	39
	All Areas	Reproduction	340	283	11,182		1,136	77		1,462			13,857	.83	41
		Pole	2,194	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.81	37
		Mature	328	47	1,278	2,011							3,289	.15	10
		All Upland	2,856	2,098	48,744	16,315	3,312	6,941	16,224	5,999			97,535	.73	34
		Stream	1,795	3,715	101,856	95	194,574		2,399	1,426	657		301,007	2.07	168
		All Types	4,651	5,813	150,600	16,410	197,886	6,941	18,623	7,425	657		398,542	1.25	86
Third	Longmire	Pole	294	1,069	12,970		903		87	15,468			29,428	3.64	100
		Stream	774	1,171	41,236		12,310		1,416	501	6		55,469	1.51	72
		All Types	1,068	2,240	54,206		13,213		1,503	15,969	6		84,897	2.10	79
	Stevens Canyon	Stream	220	551	712		23,384						24,096	2.50	110
	White River	Pole	2,603	1,209	1,384	3,196		10,515	20	4,883			19,998	.46	8
		Stream	855	407	16,440	2,268	227		703	4			18,642	.48	22
		All Types	3,458	1,616	16,824	5,464	227	10,515	723	4,887			38,640	.47	11
	All Areas	Pole	2,897	2,278	14,354	3,196	903	10,515	107	20,351			49,426	.79	17
		Stream	1,849	2,129	57,388	2,268	35,921		2,119	505	6		98,207	1.15	53
		All Types	4,746	4,407	71,742	5,464	36,824	10,515	2,226	20,856	6		147,633	.93	31
All Workings	Longmire	Reproduction	548	668	51,242		2,237		5,409	7,266			66,154	1.22	121
		Pole	294	1,069	12,970		903		87	15,468			29,428	3.64	100
		All Upland	842	1,737	64,212		3,140		5,496	22,734			95,582	2.06	114
		Stream	2,014	2,899	246,900		133,280		57,709	4,765	72		442,726	1.44	220
		All Types	2,856	4,636	311,112		136,420		63,205	27,499	72		538,308	1.62	188
	Stevens Canyon	Reproduction	2,351	218	28,071		15,986				7,915		51,972	.09	22
		Pole	704	38	176		1,052				16		1,244	.05	2
		All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17
		Stream	2,199	7,324	122,203	2,150	634,994		914	11	4,566		764,838	3.56	348
		All Types	5,254	8,080	150,450	2,150	652,032		914	11	12,497		818,054	1.54	156
	White River	Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70
		Pole	6,667	5,084	211,448	87,029	2,715	156,617	17,433	20,221	91	744	496,298	.76	74
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		All Upland	7,443	5,437	247,143	102,126	2,736	157,827	17,988	20,460	91	744	549,115	.73	74
		Stream	1,972	1,808	211,044	3,778	5,250	242	9,528	192	98	8	230,140	1.08	138
		All Types	9,115	7,245	458,187	105,904	7,986	158,069	27,516	20,652	189	752	779,255	.79	85
	Starbo	Reproduction	48	21	68	7		7		2,305			2,387	.44	50
		Pole	332	262	11,276	6,131		6,723	3,221	16,658			44,009	.79	133
		All Upland	380	283	11,344	6,138		6,730	3,221	18,963			46,396	.74	122
		Stream	46	46	2,563	575		476	546	409			4,669	1.00	102
		All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120
	All Areas	Reproduction	3,079	969	86,471	246	18,244	1,217	5,959	9,765	7,915		129,817	.31	42
		Pole	7,997	6,433	235,870	93,160	4,670	163,340	20,741	52,347	107	744	570,979	.80	71
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		All Upland	11,720	7,713	350,946	108,264	22,914	164,557	26,705	62,157	8,022	744	744,309	.66	64
		Stream	5,931	12,577	582,810	6,503	773,524	718	68,697	5,377	4,736	8	1,442,373	2.12	243
		All Types	17,651	20,290	933,756	114,767	796,438	165,275	95,402	67,534	12,758	752	2,186,682	1.15	124

BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1943

By
M. C. Riley, Technical Supervisor

The blister rust control program on Glacier National Park during the 1943 field season was conducted with one Civilian Public Service camp of 26 men doing first and second working on the East Glacier area. Funds from a regular Park Service appropriation were used to employ an experienced foreman and to cover incidental expenditures for equipment and supplies. Work started on June 16 and was completed on August 19. It had been planned to work at Two Medicine during the season but the area was not in condition to work because of late snow when the crew started and there was not sufficient time remaining when an experienced foreman would be available after finishing at East Glacier.

All first working was completed on the East Glacier area and second working was completed on all ground worked in other years. This work is located in unsurveyed sections 10, 13, 14, 15, T. 34 N., R. 15 W. Montana Meridian. After ribes eradication was finished the foreman spent some time in checking since it had not been possible to secure a checker. This check was not complete enough to give any definite information regarding possible changes in control status for the area. A large portion of the first working contained so many ribes that it will be necessary to do at least one more working. It is possible that this year's work served to place some of the area on a maintenance basis. This will be determined as soon as an adequate check can be made.

The performance of assignees from the Civilian Public Service camp was not as satisfactory as had been anticipated. Some local adjustments were made which improved the situation but conditions prevailed which were not conducive to successful ribes eradication work. The crew did not like the work and this attitude was directly reflected in their productiveness. Since the crew received no remuneration there was a tendency to perform as little work as possible. The men were not properly shod for woods work and there were no experienced men to serve as a nucleus for an efficient crew. From the experience with this particular group it is felt that Civilian Public Service crews should be used on blister rust control work only as a last resort.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work. The Bureau also supplied the necessary forms, maps and office supplies for the proper recording and reporting of data. It was not possible for the Bureau representative to spend as much time as formerly on the job, and very little scouting work was accomplished.

RECOMMENDATIONS

The only ribes eradication work which is urgent for the 1944 season on areas where control work has been started is the rework job at Two Medicine. It is estimated that this will require about 350 man-days. Before the next field season starts a decision should be made as to whether this should be done with a small crew or a large one.

RESULTS

The following tables show statements of expenditures, results of the field work for 1943 and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943
GLACIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	$ 427.35
National Park Service	Regular BLR-5	1,090.34
Total		$1,517.69

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943
GLACIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine Regular BLR-1-4	National Park Service BLR-5	Total
Sal. perm. men	$370.58	$ 769.98	$1,140.56
Travel and transp.	56.77		56.77
Contractual services		176.36	176.36
Supplies and material		86.63	86.63
Subsistence		57.37	57.37
Total	$427.35	$1,090.34	$1,517.69

TABLE 3
SUMMARY OF RIBES ERADICATION, 1943
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
East Glacier	First	Pole	281	511	20,228	9,089	4,304	24,763	58,384	1.82	208
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	302	771	20,299	9,247	4,304	69,709	103,559	2.55	343
	Second	Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
	All Workings	Pole	367	711	42,044	11,581	13,811	26,034	93,470	1.94	255
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	388	971	42,115	11,739	13,811	70,980	138,645	2.50	357

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1939-1943
GLACIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	262	301	37,155	1.15	142
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	302	771	103,559	2.55	343
	Total	3,197	3,905	464,555	1.22	145
Second	NP-Reg.	731	763	122,606	1.04	168
	NP-CPS	86	200	35,086	2.33	408
	Total	817	963	157,692	1.18	193
All Workings	NP-Reg.	993	1,064	159,761	1.07	161
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	388	971	138,645	2.50	357
	Total	4,014	4,868	622,247	1.21	155

TABLE 5

SUMMARY OF RIBES ERADICATION, 1939-1943
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme	Total Ribes	Per Acre Basis: Man-Days	Ribes
Park Headquarters	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	284	122	13,428	15,364	8,967		37,759	.43	133
		Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
		All Types	681	445	32,708	43,176	32,986		108,870	.65	160
	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	127	79	376	964	535		1,875	.62	15
		Brush	39	52	13	973	67	2	1,055	1.33	27
		All Types	300	170	3,265	2,518	1,160	2	6,945	.57	23
	All Workings	Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73
		Pole	411	201	13,804	16,328	9,502		39,634	.49	96
		Brush	78	171	9,424	22,313	8,420	2	40,159	2.19	515
		All Types	981	615	35,973	45,694	34,146	2	115,815	.63	118
Two Medicine	First	Pole	593	645	40,145	2,705	1,723	8,646	53,219	1.09	90
		Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		All Upland	653	763	44,080	3,755	6,388	10,480	64,703	1.17	99
		Stream	54	480	30,429	438		12,592	43,459	8.89	805
		All Types	707	1,243	74,509	4,193	6,388	23,072	108,162	1.76	153
	Second	Pole	90	93	11,318	250		5,658	17,226	1.03	191
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	106	113	12,813	317		8,129	21,259	1.07	201
		Stream	32	156	46,233	14		25,259	71,506	4.88	2,235
		All Types	138	269	59,046	331		33,388	92,765	1.95	672
	All Workings	Pole	683	738	51,463	2,955	1,723	14,304	70,445	1.08	103
		Subalpine	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
		All Upland	759	876	56,893	4,072	6,388	18,609	85,962	1.15	113
		Stream	86	636	76,662	452		37,851	114,965	7.40	1,337
		All Types	845	1,512	133,555	4,524	6,388	56,460	200,927	1.79	238
Lake McDonald	First	Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42
		Stream	11	39	5,184	35	1,602		6,821	3.55	620
		All Types	1,421	952	26,261	4,288	35,777		66,326	.67	47
	Second	Mature	282	303	3,173	1,305	15,996		20,474	1.07	73
		Stream	11	21	998	130	1,294		2,422	1.91	220
		All Types	293	324	4,171	1,435	17,290		22,896	1.11	78
	All Workings	Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
		Stream	22	60	6,182	165	2,896		9,243	2.73	420
		All Types	1,714	1,276	30,432	5,723	53,067		89,222	.74	52
East Glacier	First	Pole	367	1,005	44,305	14,739	11,042	65,936	136,022	2.74	371
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	388	1,265	44,376	14,897	11,042	110,882	181,197	3.26	467
	Second	Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
	All Workings	Pole	453	1,205	66,121	17,231	20,549	67,207	171,108	2.66	378
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	474	1,465	66,192	17,389	20,549	112,153	216,283	3.09	456
All Areas	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	1,244	1,772	97,878	32,808	21,732	74,582	227,000	1.42	182
		Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42
		Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
		Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		All Upland	3,111	3,126	142,170	65,923	84,591	76,416	369,100	1.00	119
		Stream	86	779	35,684	631	1,602	57,538	95,455	9.06	1,110
		All Types	3,197	3,905	177,854	66,554	86,193	133,954	464,555	1.22	145
	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30
		Pole	303	372	33,510	3,706	10,042	6,929	54,187	1.23	179
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	73
		Brush	39	52	13	973	67	2	1,055	1.33	27
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252
		All Upland	774	786	41,067	6,632	26,663	9,402	83,764	1.02	108
		Stream	43	177	47,231	144	1,294	25,259	73,928	4.12	1,719
		All Types	817	983	88,298	6,776	27,957	34,661	157,692	1.18	193
	All Workings	Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73
		Pole	1,547	2,144	131,388	36,514	31,774	81,511	281,187	1.39	182
		Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
		Brush	78	171	9,424	22,313	8,420	2	40,159	2.19	515
		Subalpine	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
		All Upland	3,885	3,912	183,237	72,555	111,254	85,818	452,864	1.01	117
		Stream	129	956	82,915	775	2,896	82,797	169,383	7.41	1,313
		All Types	4,014	4,868	266,152	73,330	114,150	168,615	622,247	1.21	155

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION AND PROGRESS OF RIBES ECOLOGY WORK IN THE NORTHWESTERN REGION FOR 1943

By
V. D. Moss, Forest Ecologist
and
H. R. Offord, Pathologist

I. SUMMARY

A. Improvement in Methods of Ribes Eradication

1. Status of work. Special reports have been prepared on two important regional eradication problems, namely: "The interrelation between size of crew, width of crew strip and method of laying string line on ribes eradication," and "A comparison between two methods of employing crews in a gang formation on ribes eradication." These two special reports have been issued by the Spokane office.

The past season, studies were instituted in the treatment of Ribes lacustre with ammonium sulfamate spray. A fall series of treatments were made on Crystal Creek of the St. Joe Forest. Two additional applications are contemplated for the coming field season, one representing spring conditions and the other applied during the summer months.

2. Future work. Extensive studies in hand methods of ribes eradication are planned for the coming season which relate to the immediate protection of white pine seedlings on recently cutover lands. The objective of the study will be to determine whether adequate protection measures can be established on recently cutover lands by undertaking two thorough workings the second and fifth years following logging as against four fast yearly workings commencing the second and continuing through the fifth year following logging. An attempt will be made to expend approximately the same number of total man-days per acre by both methods of work. The major difference between the two methods relates to thorough coverage by the two workings as against concentrating on bushes coming into larger live stem classes with each season's new growth. No additional methods work will be undertaken except the continuation of ammonium sulfamate treatments on R. lacustre.

B. Effects of Grazing on the Regeneration of Ribes and Western White Pine

1. Status of work. Studies relating to four grazing topics are being maintained: (a) Effects of grazing recently cutover lands on the germination, growth and development of ribes and western white pine seedlings, (b) Effects of deferred grazing on . . . . seedlings, (c) Effects of controlled grazing on . . . . seedlings, and (d) Effects of continuous seasonal grazing of old logged and burned-over lands on the regeneration of ribes and western white pine seedlings. Controlled grazing studies are being carried on in cooperation with the Forest Service, School of Forestry of the University of Idaho and the Potlatch Timber Protective Association. Study areas are examined at least twice a season, before and after sheep have been on the areas. Significant conclusions reached on many of these studies are stated under topic headings.

(a) Five plots were established to study the effects of grazing recently cutover lands on the germination and subsequent growth of ribes and western white pine seedlings. Three of these plots are located on the Clearwater Forest and two on the St. Joe Forest. Detailed results of two of the Clearwater plots are herein reported. All ribes were removed this past season from these two plots, but observations will be continued to denote further regeneration. Studies of these two plots have shown the following facts:

(1) Average number of main stems and laterals, feet of live stem, bush heights and number of terminal buds and leaves per bush have all been greater for ribes subjected to five years' grazing as against those protected from sheeping by the construction of exclosures.

(2) No significant ribes regeneration occurred following the disturbance directly caused by or resulting from grazing. More ribes seedlings have appeared during the past four seasons in the exclosures or areas protected from grazing than on the controls of grazed portions of the plots.

(3) Some ribes have been destroyed by trampling and browsing of sheep.

(4) Evidence points to the fact that favorable conditions are created by grazing for the germination of white pine seed.

(5) No significant loss of pine seedlings has resulted from the effects of grazing. Heavy loss of white fir and Douglas fir seedlings has occurred from trampling by sheep.

(b) Deferring grazing from cutover lands which have been under range use by sheep for some years does not appear to establish conditions favoring increased efficiency in ribes eradication by comparison with lands continuing to be grazed. The screening of ribes by the luxuriant development of associated vegetation increased on the areas protected from grazing, thus making more difficult the task of finding the ribes. Furthermore, ribes regeneration has taken place to a greater extent in the exclosure than on the controls. Germination of pine seed has been generally greater on the areas being sheeped.

(c) The effects of controlling the intensity of grazing by sheep on cutover lands have shown that overgrazing on slopes greater than 40 per cent may often result in the germination of ribes seedlings. Moderate grazing (approximate rate of 21 acres per animal unit) appears to cause no ribes regeneration problem.

(d) The effects of grazing sheep year after year on old logged and burned-over areas that have become sodded to varying degrees have little or no influence on ribes regeneration. The disturbance caused by the trampling of sheep on the range results in a favorable condition for the germination of pine seed. Increased stocking of such areas can be expected as a result of sheeping.

2. Future work. Investigations will be continued on the problems of grazing and ribes eradication. Ribes will be removed from each of the plots after five years' study. Data will continue to be taken on further ribes regeneration and on the germination and subsequent development of white pine seedlings.

C. Ecological Studies of Ribes and Western White Pine

1. Status of work. Investigations were continued the past season on the following studies: (a) The effects of variable light and moisture conditions on the germination, growth and development of R. viscosissimum, R. lacustre and Pinus monticola, (b) Resprouting habits of R. lacustre, (c) Ribes regeneration key for the western white pine region, (d) Slash disposal measures and their effects upon the regeneration and development of ribes and western white pine, (e) Stand improvement practices in relation to the ecological development of ribes and (f) Direct seeding of western white pine.

(a) The study of variable light and moisture conditions in relation to the germination, growth and development of ribes and western white pine seedlings was established under conditions of full sun, half shade and full shade light intensities. At each of these light stations seed of ribes and pine was sown on natural duff, mineral and burned-mineral soil surfaces. Major results obtained from this study are as follows:

(1) The peak of germination of R. viscosissimum seed was reached the first season with only a small portion of seed germinating the second and third years under all conditions of light and soil moisture. The peak of germination for R. lacustre seed was reached the second year under all conditions except on mineral soil at the full sun station. Heavy germination of this species has occurred each season on nearly all soil surfaces at the three light stations. The majority of pine seed germinated the first season with some carry-over into the second and third years.

(2) Germination of both ribes and pine seed generally increased from conditions of full sun to conditions of greater moisture content and lower soil temperatures under full shade. Soil moisture and soil temperature relations govern the extent of germination that has occurred on any soil surface under the three intensities of light. Percentage germination (of total seeds sown) was highest in nearly all cases on mineral soil and lowest on the natural duff surface.

(3) Under the three intensities of light, growth and development of ribes were significantly greater on the burned-mineral soil surface than on the mineral and duff surfaces. Minimum growth of ribes occurred on mineral soil.

(4) Mortality of ribes was highest under conditions of full shade with minimum loss occurring under conditions of half shade. The important causal agencies of mortality for both pine and ribes seedlings were damping-off fungi, winter kill and high surface soil temperatures with some loss from drought and insects.

(b) The study of resprouting of R. lacustre was undertaken to determine the size and portion of roots capable of asexual development. Three treatments were employed, namely: (1) roots cut leaving crown tissue attached, (2) roots cut about 1 inch below the root crown and (3) roots cut at least 6 inches in all directions from the root crown proper. These series of treatments were made to bushes on north and south exposures during the spring, summer and fall seasons. The following are the important results of this study:

(1) All resprouting was restricted to roots having definite root-crown tissue. Roots beyond 6 inches in all directions from the root-crown proper need not be removed.

(2) All aerial plant parts such as layering stems, buried stems, stolons, and small pieces of broken stem must be removed from the ground and placed on some object to dry.

(3) Resprouting of R. lacustre roots with crown tissue increases as the season advances from spring to the fall season.

(4) Likelihood of R. lacustre roots resprouting is significantly greater on south-facing slopes than on northern aspects.

(5) Many roots severed from the root-crown proper have retained healty appearing cambium for more than one year without resprouting. These roots will be re-examined this coming field season to determine their condition.

(c) The ribes regeneration key developed for the western white pine type has proven highly efficient in establishing a systematic basis for judging the potential ribes seedling contingency associated with an area. The principle involved in the derivation of the key is one of systematizing all ecological facts which indicate an association favorable to the regeneration of ribes. Work is being continued on reclassifying species associations and adjusting weights assigned to the various vegetative classes comprising the key. The regeneration key is now available for practical field use.

(d) Studies of slash disposal measures in the western white pine type are being carried on in cooperation with the Forest Service, Potlatch Forests, Inc. and the Slash Disposal Committee of the Inland Empire Section of the Society of American Foresters. The past season slash disposal studies involved continuation of work on areas receiving partial disposal and areas receiving complete disposal measures. On areas of partial disposal, logging slash has been piled and burned along right-of-ways, along ridges and an occasional fire lane has been built between ridges to break the main body of slash into units around five acres each. This method materially reduces the fire hazard to relatively safe standards while preventing excessive loss of seed trees. Ribes regeneration has been fairly light on these areas with nearly all seedlings originating along skid trails, roads and around the few scattered, burned slash piles. Pine seedlings are appearing freely throughout the areas under all conditions of soil surfaces.

Studies of complete disposal have been made of areas subjected to double burns. The first burn was obtained by permitting a slow ground fire to creep through the area in late fall. This resulted in materially reducing the fire hazard while killing the majority of defective and unmerchantable species of trees left on the area after logging. Trees which had not fallen naturally by the end of the first or second years after first burning were felled and the entire area given an intense second burn during the early fall season. Ribes germinating following the first burn were killed by the hot second burn. Since most of the duff mantle was consumed by the second burn ribes regeneration has been at a minimum. This type of treatment in the disposal of slash and defective species remaining on an area after all commercial logs have been taken is by far the most encouraging method yet demonstrated for minimizing the ribes eradication problem while preparing an area for planting.

(e) Ribes ecological studies are being continued in cooperation with Timber Management of the Forest Service and the Northern Rocky Mountain Forest and Range Experiment Station relating to stand improvement practices for the western white pine type. The bulk of this work is being carried on in the Kaniksu and Coeur d'Alene National Forests. The past season ecological observations were made of stand improvement studies established by the Deception Creek Experiment Station on the Coeur d'Alene Forest and of thinnings, weedings and hemlocking on the Kaniksu Forest.

(f) Studies in direct seeding of western white pine were continued and expanded in scope during the past season on the Kaniksu. Encouraging results were obtained for both spot planting and broadcast sowing in the use of germinated seed. Studies are now under way on this problem at Moscow, Idaho, and will be carried into the field this coming season.

II. FIELD WORK

A. Treatment of R. lacustre with Ammonium Sulfamate Spray

On September 8 six milacre plots were located on which a reasonably heavy coverage of R. lacustre occurred. The plots are on Crystal Creek on the old sheepherder's road about two miles above Fernwood. To reach the plot area it is necessary to walk a few chains toward Crystal Creek down a small draw from the point at which the old road becomes impassable and then follow the railroad grade downstream about a quarter mile.

On September 9 the six R. lacustre plots were treated by aqueous ammonium sulfamate applied as a combination top spray and soil drench at the uniform dosage rate shown in table 1.

TABLE 1

RIBES DATA AND DOSAGE OF AMMONIUM SULFAMATE
R. LACUSTRE MILACRE PLOTS
CRYSTAL CREEK, ST. JOE NATIONAL FOREST, 1943

Plot Number	Pounds of Chemical Per Milacre	Ribes Data		Per Cent of Milacre Plot Occupied by Ribes
		No. of Bushes	Feet of Live Stem	
3	1[1]	11	250	45
1	2	18	550	65
5	3	13[2]	500	85
2	5	16	375	80
6	6	13	400	70
4	8	18	600	80

[1] This dosage was dissolved in 2 gallons of water; all others dissolved at rate of 1 pound chemical per gallon of water.

[2] On this plot in addition to these R. lacustre there were three R. petiolare, having a total of 25 F.L.S.

Results from these plots will not be available until the early summer of 1944.

B. Effects of Grazing on the Regeneration of Ribes and Western White Pine

Effects of Grazing Recently Cutover Lands on the Germination, Growth and Development of Ribes and Western White Pine Seedlings

Previous discussions of this study have been given in the 1939 to 1942 annual reports. Data presented in table 2 are final summaries for plots 1 and 2 on the Clearwater Forest which have been subjected to five years or seasons of grazing by sheep. All ribes were removed from these plots at the close of the past field season. Continued observations will be made of these studies to denote any further ribes regeneration and to undertake a detailed study on the regeneration and growth of western white pine seedlings.

TABLE 2

COMPARISON OF MORPHOLOGICAL FEATURES OF RIBES ON GRAZED AND UNGRAZED AREAS OF PLOTS 1 AND 2 IN THE CLEARWATER FOREST

Year Data Taken	Total No. Ribes	Averages Per Bush								
		Total Main Stems		Total Laterals		Total Feet Live Stem		Bu. Ht.	Number Terminal	Total Number
		No.	F.L.S.	No.	F.L.S.	Old	New	Ft.	Buds	Leaves
Plot No. 1 - Exclosure										
1939	76	1.11	.19	.05	.00	.06	.14	.27	1.08	5.61
1940	79	1.10	.39	.96	.12	.18	.34	.35	1.97	10.61
1941	77	1.14	.79	1.36	.29	.49	.59	.72	2.30	14.97
1942	73	1.19	1.15	3.77	.84	1.08	.90	1.01	3.27	27.07
1943	72	1.18	1.40	5.65	1.51	1.95	.97	1.18	6.40	33.42
Plot No. 1 - Control										
1939	92	1.04	.27	1.11	.12	.14	.28	.24	1.14	6.65
1940	93	1.09	.53	2.63	.57	.41	.69	.60	3.33	22.42
1941	89	1.16	.83	4.42	1.20	1.01	1.02	1.02	4.62	24.88
1942	88	1.27	1.14	8.61	2.46	1.89	1.72	1.32	8.69	45.36
1943	87	1.22	1.28	11.10	3.28	3.47	1.09	1.49	11.29	55.49
Plot No. 2 - Exclosure										
1939	39	1.20	.32	1.08	.14	.18	.28	.31	2.18	7.85
1940	40	1.23	.61	1.68	.30	.45	.45	.54	2.78	12.95
1941	34	1.35	1.02	2.32	.36	.80	.57	.81	3.44	15.56
1942	37	1.32	1.20	3.92	.65	1.23	.62	.97	4.65	23.47
1943	35	1.20	1.25	5.40	.88	1.46	.79	1.10	6.17	30.34
Plot No. 2 - Control										
1939	17	1.59	1.17	2.94	.19	.61	.74	.37	2.51	6.35
1940	17	1.76	1.43	4.00	.41	1.35	.48	.78	5.53	30.94
1941	15	1.33	.99	6.93	.76	1.26	.52	.95	7.20	27.47
1942	15	1.73	1.67	6.40	.89	1.72	.95	1.16	7.07	34.60
1943	15	1.53	1.59	8.67	1.17	2.17	.68	1.24	8.40	40.73

Plot 1, located on an easterly exposure, had 76 ribes on the exclosure and 92 on the control or grazed portion at the start of the study. In five years' time ribes populations in the exclosure have varied from 79 bushes in 1940 to 72 bushes in 1943. Ribes populations on the control have varied from a high of 93 bushes in 1940 to 87 bushes in 1943. Ribes populations on the exclosure and control by comparison with one another have neither significantly increased nor decreased during this period.

Plot 2, located on a westerly aspect, had 39 ribes in the exclosure and 17 on the control at the start of the study. Ribes populations in the exclosure have varied from 40 bushes in 1940 to 35 bushes in 1943. Ribes on the control have varied from 17 bushes in 1939 to 15 bushes in 1943. Sheeping has thus neither significantly increased nor decreased ribes populations over natural conditions in the protected exclosure.

Comparisons between exclosures and controls for main stems, laterals, feet of live stem, bush heights, number of terminal buds and number of leaves per bush result in some interesting relations. Main stems per bush for ribes in the exclosure of plot 1 increased from 1.11 with .19 feet of live stem in 1939 to 1.18 main stems with 1.40 feet of live stem per bush in 1943. On the control, main stems increased from 1.04 with .27 feet of live stem per bush in 1939 to 1.22 main stems with 1.28 feet of live stem in 1943. Main stems per bush for ribes in the exclosure of plot 2 commenced with 1.20 with .32 feet of live stem increased to 1.35 with 1.02 feet of live stem in 1941 and dropped back to the original 1.20 main stems per bush in 1943 with 1.25 feet of live stem. On the control, main stems varied from 1.59 with 1.17 feet of live stem in 1939 to a high of 1.76 with 1.43 feet of live stem in 1940. In 1941, main stems per bush decreased to 1.33, increased in 1942 to 1.73 and fell off to 1.53 with 1.59 feet of live stem in 1943. Sheeping was found responsible for about half the loss in main stems on the control with natural die-back accounting for the remaining loss as well as that occurring on the exclosure.

Laterals per bush for ribes in the exclosure of plot 1 increased from .05 in 1939 to 5.65 with 1.51 feet of live stem in 1943. On the control, laterals increased from 1.11 in 1939 to 11.10 with 3.28 feet of live stem in 1943. Laterals per bush for ribes in the exclosure of plot 2 increased from 1.08 with .14 feet of live stem in 1939 to 5.40 with .88 feet of live stem in 1943. On the control, laterals increased from 2.94 with .19 feet of live stem in 1939 to 8.67 with 1.17 feet of live stem in 1943. Sheeping has to some degree been responsible for increasing the number of laterals per bush but the major difference occurred in the number of bushes forced to produce laterals by nipping of terminal buds.

Total feet of live stem per bush for ribes in the exclosure of plot 1 increased from .20 in 1939 to 2.92 feet in 1943. On the control, total live stem increased from .42 feet per bush in 1939 to 4.56 feet in 1943. Ribes in the exclosure of plot 2 increased from .46 feet of live stem in 1939 to 2.25 feet in 1943. On the control, total live stem per bush increased from 1.35 feet in 1939 to 2.85 feet in 1943. Ribes on the controls of plots 1 and 2 not only have more live stem per bush, but they are noted to be taller than those on the exclosures. Ribes in the exclosure of plot 1 had an average bush height of .17 feet in 1939 which increased to 1.18 feet in 1943. Average height per bush on the control in 1939 was .34 and this increased to 1.49 in 1943. Ribes in the exclosure of plot 2 had an average height of .31 feet in 1939 which increased to 1.10 feet in 1943. On the control, average height of ribes increased from .47 feet in 1939 to 1.24 feet in 1943. The ecological conditions found affecting both the amount of live stem and heights of ribes have been the degree of competition developing around each ribes bush. Growth of ribes in the exclosure is being significantly affected by the high degree of competition developing around them from associated vegetation. Grazing of the controls has kept competition open and ribes have consequently had more ideal conditions for growth.

Average bush height for ribes in the exclosure of plot 1 increased from .27 in 1939 to 1.18 feet in 1943. On the control, average height per bush increased from .24 feet in 1939 to 1.49 feet in 1943. Ribes in the exclosure of plot 2 increased from .31 feet in 1939 to 1.10 feet in height per bush in

1943. Average height per bush of ribes in the control increased from .37 feet in 1939 to 1.24 feet in 1943.

Number of terminal buds on bushes in the exclosure of plot 1 increased from 1.08 per ribes in 1939 to 6.40 in 1943. On the control, average terminal buds per bush increased from 1.14 in 1939 to 11.29 in 1943. Terminal buds on ribes in the exclosure of plot 2 increased from 2.18 in 1939 to 6.17 in 1943. On the control the increase was from 2.51 in 1939 to 8.40 in 1943. Nipping of terminal buds by sheep on main stems and laterals stimulates the formation of many adventitious laterals which accounts for the greater number of terminal buds on bushes subjected to five years' grazing.

Average leaves per bush for ribes in the exclosure of plot 1 increased from 5.61 in 1939 to 33.42 in 1943. Leaves on bushes in the control increased from 6.65 in 1939 to 55.49 in 1943. Ribes in the exclosure of plot 2 had an increase in leaves per bush from 7.85 in 1939 to 30.34 in 1943. Average leaves for ribes on the control increased from 6.35 in 1939 to 40.73 in 1943. The greater number of leaves for bushes on the control has resulted from the increase of laterals caused by nipping of terminal buds by the sheep.

TABLE 3

COMPARISONS OF SURVIVAL AND MORTALITY OF RIBES SEEDLINGS ON GRAZED AND UNGRAZED PORTIONS OF PLOTS 1 AND 2 IN THE CLEARWATER FOREST

	Exclosure			Control		
	Number Alive	Number Dead	Total	Number Alive	Number Dead	Total
Plot No. 1-Ribes by Year of Origin and Mortality						
1935 to 1939	61	12	73	85	7	92
1940	9	2	11	2	0	2
1941	1	1	2	0	0	0
1942	0	0	0	0	0	0
1943	1	0	1	0	0	0
Total	72	15	87	87	7	94
Plot No. 1-Pine by Year of Origin and Mortality						
1935 to 1939	195	52	247	172	58	230
1940	19	2	21	18	3	21
1941	3	1	4	1	2	3
1942	4	1	5	2	3	5
1943	4	0	4	11	0	11
Total	225	56	281	204	66	270
Plot No. 2-Ribes by Year of Origin and Mortality						
1935 to 1939	32	11	43	15	2	17
1940	1	0	1	0	0	0
1941	2	0	2	0	0	0
1942	0	0	0	0	0	0
1943	0	0	0	0	0	0
Total	35	11	46	15	2	17
Plot No. 2-Pine by Year of Origin and Mortality						
1935 to 1939	58	13	71	53	14	67
1940	3	0	3	10	2	12
1941	2	1	3	1	4	5
1942	2	1	3	4	4	8
1943	0	0	0	5	0	5
Total	65	15	80	73	24	97

In table 3 are shown the number of ribes and pine seedlings by years of origin. For the years 1935 to 1939 are shown the number of ribes and pine seedlings originating on the areas from the time of logging up to the time the study was established and sheep were brought in for the first time. Grazing does not appear to have affected the regeneration of ribes seedlings over a four-year period since 11 seedlings have appeared on the exclosure of plot 1 during this time as against 2 seedlings on the control. Three ribes seedlings have appeared on the exclosure of plot 2 and none on the control. Thirty pine seedlings have originated on the exclosure of plot 1 and 32 on the control. On plot 2 seven pine seedlings have regenerated on the exclosure and 20 on the control. The effects of sheeping on the regeneration of ribes and pine seedlings is a problem of some years' duration. It can be

stated, however, that for the period of four years no evidence has been found which would substantiate a statement that sheep grazing is causing a ribes regeneration problem in the region. Evidence points toward the possibility that moderate or controlled grazing establishes a condition favorable to the germination of pine seedlings.

TABLE 4

CLASSIFICATION OF PINE AS TO YEAR OF ORIGIN, NUMBER INFECTED AND CAUSAL AGENCIES OF MORTALITY FOR THE GRAZED AND UNGRAZED PORTIONS OF PLOTS 1 AND 2 IN THE CLEARWATER FOREST

	Year of Origin	No. Pine	Number Pine Infected	Causal Agencies of Mortality				Total Number Dead Pine
				Blister Rust	Natural Causes	Rodents	Sheep	
Plot No. 1 Exclosure	Up to 1938	144	58	10	16			26
	1939	103	19	5	21			26
	1940	21			2			2
	1941	4			1			1
	1942	5			1			1
	1943	4						
Total		281	77	15	41			56
Plot No. 1 Control	Up to 1938	136	47	10	23			33
	1939	94	24	6	18		1	25
	1940	21	2		2		1	3
	1941	3			2			2
	1942	5			3			3
	1943	11						
Total		270	73	16	48		2	66
Plot No. 2 Exclosure	Up to 1938	35	10		3			3
	1939	36	6	2	8			10
	1940	3						
	1941	3			1			1
	1942	3			1			1
	1943							
Total		80	16	2	13			15
Plot No. 2 Control A and B	Up to 1938	31	2		4	3		7
	1939	36	1	1	5	1		7
	1940	12			2			2
	1941	5			4			4
	1942	8			4			4
	1943	5						
Total		97	3	1	19	4		24

In table 4 are shown the number of pine seedlings by year of origin, number of pine infected and causal agencies of mortality for ribes on the exclosures and controls of plots 1 and 2. Blister rust has been the causal agency of mortality for 15 seedlings on the exclosure and 16 seedlings in the control of plot 1. Forty-one seedlings have succumbed from natural causes on the exclosure and 48 on the control. Two seedlings were lost from sheeping on the control.

On plot 2, two seedlings were killed by blister rust on the exclosure and one in the control. Natural causes removed 13 seedlings in the exclosure and 19 from the control. Four seedlings were killed by rodents on the control and none were lost from sheeping. Sheep have not been responsible for any significant loss of seedlings on either of these two plots.

In conclusion, the following facts seem worthy of emphasis: (1) Height and number of stems, lateral and terminal buds and leaves of ribes increase as the result of grazing, (2) No ribes regeneration problem appears to be associated with the disturbance caused by grazing, (3) Evidence points to the fact that conditions are created by grazing which are favorable to the germination of pine seed, (4) No significant loss of pine seedlings has occurred from the effects of grazing by sheep.

The Effects of Variable Light and Moisture Conditions on the Germination, Growth and Development of R. lacustre, R. viscosissimum and P. monticola.

Previous reports on this study have been made on pages 122 to 126 of the 1940 annual report, pages 119 to 126 of the 1941 annual report, and pages 124 to 128 of the 1942 report.

This ecological study was established in 1940 for the purpose of measuring important factors influencing germination, survival and growth of the two major species of ribes and western white pine under full sun, half shade and full shade light intensities. At each of these light stations seed of ribes and pine were sown on natural duff, mineral, and burned-mineral soil surfaces. Seedbeds were examined for germination at ten-day intervals during the first growing season and at approximately monthly intervals during the second and third years. During the month of August and the early part of September of each season, intensive studies were made of mortality, aerial and root growth, and soil moisture and temperature. Soil samples were taken at the close of each season for hydrogen-ion determinations.

All ribes were removed from the plots upon termination of growth for the third season. This was accomplished by pulling the bushes from three of the five subplots and cutting bushes at or below ground level from the two remaining subplots of each soil surface. In the latter case bushes were cut with hand pruning shears leaving the ground undisturbed to permit continued observation on germination of total seed sown. On the three subplots where bushes were pulled, the objective is one of determining what effects the disturbance will have in stimulation of further germination. The disturbance was timed to correspond with that caused by initial eradication of recently cutover areas, first working being undertaken when majority of ribes are three years of age. Because ribes numbers varied between subplots, a hundred per cent disturbance was made to a depth of 1/2 inch after the bushes had been pulled. This was done in order to obtain comparable conditions within and between subplots and to obtain knowledge of what to expect from maximum disturbances of the three soil surfaces.

TABLE 5

NUMBER OF RIBES AND WHITE PINE SEED GERMINATING DURING THE SEASONS 1941, 1942 AND 1943, TOTAL SEED GERMINATING DURING THIS PERIOD, AND PER CENT OF TOTAL SEED SOWN GERMINATING

Surface	Species	Light Intensity	Number Seed Germinating by Seasons			Total Seed Germinating	Per Cent of Total Seed Sown Germinating
			1941	1942	1943		
Duff	Ribes lacustre	Full Sun	15	674	19	708	4.4
		Half Shade	42	1,348	239	1,629	10.2
		Full Shade	771	5,968	479	7,218	45.1
	Ribes viscosissimum	Full Sun	16	2	0	18	.1
		Half Shade	54	1	0	55	.3
		Full Shade	288	0	68	356	2.2
	Western White Pine	Full Sun	20	6	0	26	1.3
		Half Shade	49	90	5	144	7.2
		Full Shade	841	212	37	1,090	54.5
Mineral	Ribes lacustre	Full Sun	3,184	2,134	57	5,375	33.6
		Half Shade	2,725	6,078	367	9,170	57.3
		Full Shade	1,937	6,191	1,992	10,120	63.2
	Ribes viscosissimum	Full Sun	1,322	7	0	1,329	8.3
		Half Shade	1,092	11	0	1,103	6.9
		Full Shade	1,083	0	3	1,086	6.8
	Western White Pine	Full Sun	883	14	0	897	44.8
		Half Shade	1,170	29	11	1,210	60.5
		Full Shade	1,434	44	21	1,499	74.9
Burned-Mineral	Ribes lacustre	Full Sun	1,966	5,967	23	7,956	49.7
		Half Shade	2,650	8,493	437	11,580	72.4
		Full Shade	2,233	6,326	1,183	9,742	60.9
	Ribes viscosissimum	Full Sun	740	13	0	753	4.7
		Half Shade	1,556	19	0	1,575	9.8
		Full Shade	1,554	0	44	1,598	10.0
	Western White Pine	Full Sun	314	1	0	315	15.7
		Half Shade	1,200	39	7	1,246	62.3
		Full Shade	1,379	49	13	1,441	72.0

In table 5 the number of ribes and pine seed germinating during the seasons 1941, 1942 and 1943 are shown for the three soil surfaces under the three intensities of light. Values are also given for the total number of seeds germinating and the per cent of total seed sown germinating during the three years. A total of 16,000 ribes seed was sown on each plot or soil surface. This was at the rate of 800 seeds per square foot. Pine was sown at the rate of 100 seeds per square foot, totaling 2,000 for each plot.

The peak of germination for R. lacustre seed was reached the second season with the exception of seed on mineral soil at the full sun station. The peak of germination for R. viscosissimum occurred the first season with appreciably no seedlings appearing the second or third years. The bulk of

pine seed germinated the first season with the exception of seed sown on duff surface at the half shade station. The ribes regeneration problem in the Northwestern Region is thus one of prolonged germination for R. lacustre and one of short duration for R. viscosissimum.

The type of soil surface was found to materially affect the extent of germination through regulation of soil moisture and soil temperature. The degree to which these climatic and edaphic factors vary is related to the intensity of light; soil moisture increasing toward conditions of full shade and soil temperature decreasing toward conditions of full shade. Of the total number of seeds germinating, R. lacustre increased from conditions of full sun to full shade with the exception of seed on burned-mineral at the half shade station. Germination of R. viscosissimum seed increased from conditions of full sun to full shade on duff and burned-mineral soils. On mineral soil, germination was highest at the full sun station and decreased toward conditions of full shade. Germination of pine seed increased on all three soil surfaces from full sun to conditions of full shade.

The per cent of total seed sown which has germinated in the three seasons gives some interesting comparisons between species as well as between soil surfaces and light intensities. Seed of R. lacustre germinated far more readily than seed of R. viscosissimum under all intensities of light and on all three soil surfaces. These differences are truly the result of reactions between the two species of seeds and their environment because previous laboratory controlled germination tests on samples of seed from the same lots showed that each lot contained about the same percentage of viable seed. Duff surface is not a good medium for seed germination except under moist conditions of full shade. Differences in germination of seed on mineral and burned-mineral soil surfaces are pronounced at the full sun station.

Mortality of ribes seedlings has been heaviest under conditions of full shade. Ribes viscosissimum seedlings generally disappear the same season of germination at this station, but many R. lacustre seedlings persist through the second and third years. Heavy mortality of both ribes and pine seedlings has occurred on duff and burned-mineral soil surfaces at the full sun station. High surface soil temperatures and winter kill have been factors largely responsible for loss of seedlings at this station. Minimum mortality of both ribes and pine seedlings has occurred at the half shade station. Causal agencies of mortality have been losses from high surface soil temperatures, drought, winter kill, damping-off fungi and insects.

TABLE 6

pH MEASUREMENTS OF SOIL SAMPLES TAKEN FROM LIGHT-MOISTURE PLOTS, LIGHT CONDITIONS AND SOIL SURFACES AS SHOWN

Soil Zone	pH of Soil Sample											
	Duff Surface				Mineral Surface				Burned-mineral Surface			
	1940	1941	1942	1943	1940	1941	1942	1943	1940	1941	1942	1943
Full Sun Station												
Surface	5.04	5.33	5.30	5.58	5.99	6.18	6.10	6.29	7.49	7.16	7.29	7.53
6-inch	5.57	5.84	5.71	6.10	5.67	6.01	5.97	6.18	5.59	6.26	5.90	6.27
12-inch	5.79	5.75	6.10	6.29	5.92	5.92	5.89	6.18	6.62	6.18	6.18	6.10
Half Shade Station												
Surface	5.29	5.27	5.09	5.67	5.79	5.84	6.18	6.02	7.22	6.95	6.60	6.39
6-inch	6.01	6.35	6.31	6.10	5.97	6.26	6.10	6.10	6.05	6.24	6.18	6.37
12-inch	5.90	6.01	6.01	6.10	5.72	5.93	5.84	6.01	5.92	5.96	5.90	6.18
Full Shade Station												
Surface	5.36	5.17	5.58	5.53	6.01	6.01	6.18	6.22	7.20	7.20	7.28	7.03
6-inch	5.92	5.90	5.75	6.34	5.88	6.01	5.84	6.42	5.58	5.82	6.18	6.52
12-inch	5.90	5.67	5.84	6.10	5.63	5.67	6.01	6.27	5.92	5.84	5.88	6.35

Hydrogen-ion determinations are shown for the four years of sampling in table 6. These values are given for three depths of sampling on the duff, mineral and burned-mineral soil surfaces at each of the light stations. No important change has taken place in pH on the duff surface, the hydrogen-ion concentration decreasing in acidity with depth of sampling. Disturbance of mineral soil has decreased the acidity of the surface sample. Alkalinity of the burned-mineral surfaces has decreased somewhat each year with the leaching of ash into the lower sampling depths.

Resprouting Habits of R. lacustre

A previous discussion of this study has been given on pages 128 and 129 of the 1942 annual report. The problem involved was one of determining the size and portion of R. lacustre roots capable of resprouting. This information was required for the purpose of instructing crews on adequate methods of eradicating this species of ribes which would minimize or prevent asexual regeneration. Distance of broken-off roots from the root-crown proper and size of roots which could resprout were two of the important questions of the study. It had been found that considerable time was often used in having crews search for and remove all roots irregardless of their size or distance the root had been broken off from the root-crown proper. It was estimated that from one half to three fourths of the total pulling time involved in the removal of a R. lacustre bush was oftentimes used in digging and searching for roots not capable of resprouting. The objective of the study also covered the extent to which exposure and season of year influenced resprouting. Three root treatments were employed, namely: (1) roots were severed at the crown leaving a portion of crown tissue attached to the root, (2) roots were cut about 1/2 inch to one inch below the root-crown proper and (3) roots were cut at least six inches in all directions from

the root-crown proper. Twenty-five bushes were decapitated for each of the three treatments. Replication of treatments was made during the spring, summer and fall seasons. Final check on the actual number of roots treated and the number resprouting was made at the end of the season following treatment.

TABLE 7

RESPROUTING HABITS OF R. LACUSTRE ROOTS ON A NORTH AND SOUTH EXPOSURE WHEN SEVERED LEAVING CROWN TISSUE ATTACHED, CUT ONE ONCH BELOW CROWN AND SIX INCHES IN ALL DIRECTIONS FROM THE ROOT CROWN

Season	Type of Treatment	Number Roots Treated	No. Roots Respr.	Per Cent Roots Respr.	Per Resprouting Root			Green Roots	Bushes Respr.	
					No. Stems	F.L.S.	No. Leaves		No.	Per Cent
North Exposure										
Spring	On Crown	80	2	2.5	1	1.10	38	13	2	8.0
	Off Crown	93	0	0	0	0	0	2	0	0
	Below Crown	103	0	0	0	0	0	0	0	0
Summer	Above Crown	76	7	9.2	3.3	1.06	17.4	15	7	28.0
	Through Crown	88	1	1.1	2.0	.30	9	3	1	4.0
	Below Crown	95	0	0	0	0	0	0	0	0
Fall	On Crown	78	14	17.9	1.9	.52	17.4	30	9	36.0
	Off Crown	84	3	3.6	1.7	.57	18.7	2	3	12.0
	Below Crown	97	0	0	0	0	0	0	0	0
South Exposure										
Spring	On Crown	79	6	7.6	4.3	2.22	64.3	24	6	24.0
	Off Crown	85	2	2.4	1.5	1.00	12.5	1	1	4.0
	Below Crown	97	0	0	0	0	0	0	0	0
Summer	On Crown	74	15	20.3	4.3	2.21	59.2	6	12	48.0
	Off Crown	91	0	0	0	0	0	0	0	0
	Below Crown	106	0	0	0	0	0	0	0	0
Fall	On Crown	82	17	20.7	2.8	1.48	45.6	18	14	56.0
	Off Crown	89	0	0	0	0	0	0	0	0
	Below Crown	94	0	0	0	0	0	0	0	0

On crown: Roots cut leaving crown tissue attached
Off crown: Roots cut about one inch below crown
Below crown: Roots cut six inches in all directions from crown

The headings in table 7 show the number of roots treated, number of roots resprouting, per cent of total roots treated which have resprouted, number of roots with green cambium present but showing no evidence of resprouting and number and per cent of the 25 bushes decapitated for each treatment which have regenerated asexually from one or more resprouting roots. Number of roots are observed to increase as cutting treatments were extended away from the root-crown proper. This is because a class of small secondary feeder roots is encountered a short distance off the root-crown proper. Green roots are those still retaining normal appearing cambium but not resprouting.

The bulk of such roots is associated with the treatment of cutting primary roots from the root-crown proper and leaving a small portion of crown tissue attached. The per cent of total bushes treated has been calculated from the ratio of the number resprouting to the 25 bushes decapitated by each treatment.

The results of this study have shown that all resprouting was restricted to roots with definite root-crown tissue attached. This was true in all cases including the roots resprouting which had been cut from 1/2 to one inch below the root-crown. Cutting roots at least six inches in all directions from the root-crown proper resulted in no resprouting since such roots are well beyond the zone of demarkation between crown and root tissue. There is no need, therefore, of having crews search for and remove all small roots that have been broken off beyond the distance of six inches in all directions from the root-crown proper. Precautionary measures must be stated, however, in instructing crews to carefully remove all aerial portions of the bush and all supplemental root crowns which have originated asexually from rooted stems.

Resprouting of the total number of roots treated increased from the spring to fall series. Treatments on the north exposure resulted in eight per cent of the bushes resprouting for the spring series, 28 per cent for the summer series, and 36 per cent for the fall series. The same treatment on the south exposure resulted in 24 per cent of the bushes resprouting for the spring series, 48 per cent for the summer series and 56 per cent for the fall series. Danger from resprouting thus increases as the season advances. This is due to the fact that a bush in midsummer has had more time to manufacture reserve food, likewise a bush treated during the fall has more reserve food in store than a bush treated in midsummer. The stimulus for resprouting appears to be the quantity of reserve food the bush has stored in the roots and root-crown at the time the aerial portion is removed.

Considerably more resprouting occurred on the south exposure than on the north exposure. For the spring series of treatments 8 per cent of the roots resprouted on the north exposure and 24 per cent on the south. For the summer series 28 per cent of the bushes resprouted on the north exposure as against 48 per cent on the south. For the fall series of treatments 36 per cent of the bushes resprouted on the north exposure and 56 per cent on the south exposure. Ribes on the north exposure had long, trailing and few stems; large, thin and few leaves and roots somewhat shallow in comparison to those on the south exposure. Those on the south exposure had rather short, stout and many stems; somewhat small, thick and many leaves and deep penetrating roots. Bushes on the south exposure had the advantage of not only an earlier growing season but a longer day in terms of both intensity of light and hours of light for the manufacture of reserve food.

III. LABORATORY AND GREENHOUSE WORK

The laboratory, greenhouse and ribes garden at Berkeley were actively maintained throughout 1943. In September arrangements were completed with the School of Forestry, Moscow, Idaho, for office, laboratory and greenhouse space to be occupied and used for disease and methods work by C. R. Stillinger

under the supervision of V. D. Moss. Greenhouse tests on the direct seeding of western white pine will be in progress early next year.

Special activities at Berkeley and Spokane during the year have included: (1) Germination tests on ribes and on western white pine and sugar pine seed, (2) Germination tests on poison oak seed and toxicity studies on the sterilizing action of boron on Camp Adair soils, (3) Greenhouse tests with sodium chlorosulfonate, ammonium sulfamate, and other chemicals, as possible herbicides for ribes eradication, (4) pH determinations on 27 samples of soil from Kaniksu light-moisture plots, (5) Chemical tests for identification of cankers on western white pine and sugar pine, (6) Determinations of moisture equivalent and wilting point percentages of 27 soil samples from the Kaniksu plots and of over 100 soil samples from problem areas in the Sugar Pine Region, (7) Construction of special apparatus for soils work and for wilting point tests by the barium nitrate equilibrium method, (8) Statistical analysis of field methods data from Idaho and of data from ribes and pine seed germination tests at Berkeley and at Spokane. Such 1943 data as are now available on the above topics are included in the following special reports which were prepared and made available to Blister Rust personnel during the calendar year of 1943:

Serial No. 116:
"Experimental Germination of Ribes Seeds." Series of 1942.
.....C. R. Quick

Serial No. 117:
"Effects of Density of Planting on Growth in the Greenhouse of Ribes Roezli Seedlings." .....C. R. Quick

Serial No. 118:
"Status Report on Reagents and Methods as Field Aids in Distinguishing Between Diseasedand Normal White Pine Tissue and Between Roots and Underground Stems of Ribes." .....H. R. Offord

Serial No. 119:
"The Effects of Ceanothus Cordulatus (Snowbrush) Seedlings on the Growth of Ribes Roezli (Sierra Gooseberry) Seedlings."
.....C. R. Quick

Serial No. 120:
"Experimental Germination of Ribes and Pine Seeds." Series of 1943.
.....C. R. Quick

Spokane Office (Methods and Operations):
"Size of Crew, Width of Strip and Methods of Laying String."
.....Virgil D. Moss (in cooperation with St. Joe operation)

Bureau MS No. 6835:
"Certain Methods of Forcing the Germination of Seeds." Journ. Calif. Hort. Soc., Vol. IV, 3:95-102. (1943)
.....C. R. Quick

RESULTS OF INVESTIGATIONS ON THE WHITE PINE BLISTER RUST

By
C. R. Stillinger, Pathologist

INTRODUCTION

The present report gives preliminary subject matter summaries of investigations of the various phases of the white pine blister rust which affect the application of control measures in the Inland Empire. This procedure has been adopted for the 1943 annual report in lieu of data obtained from the several field plots. The statements in this report are tentative, representing conclusions which are based on the analyses of data having been obtained during the past few years from plot studies, or from data issued by others.

BLISTER RUST CONDITIONS IN 1943

Rain during May and June of 1943 probably kept the aeciospores filtered out of the air so that there was very little opportunity for long distance spread from the pine to ribes. The presence of great masses of spores at the base of trees having large fruiting cankers indicated that a large part of the spores which had been liberated were washed to the ground by the rain instead of being carried away by the wind. However, on all plots where the ribes were inspected the per cent of the bushes and leaves infected was approximately the same in 1943 as in 1942. Since these bushes were all in fairly close proximity to fruiting cankers this was to be expected.

Although the 1943 season had more rain than 1942 and the rain was distributed at 10 to 14 day intervals, a climatic condition apparently favorable for the intensification of the rust on ribes, yet only 42 per cent as much rust was found per infected leaf as was found in 1943. Since climatic conditions appeared to be favorable for the intensification of the rust, but were unfavorable for the spread of the aeciospore, the decrease in the amount of the rust on ribes was probably due to the decrease in volume of the infection of the ribes by the aeciospores.

A rainy period prevailed from August 29th to September 3rd with almost continuous cloudy weather, but at that time the temperature was too low to be favorable for any great amount of pine infection to take place. Furthermore much of the telia had already germinated and as a result only a very small amount of inoculum was produced. Under these circumstances it is probable that very little pine infection took place.

PERIODS OF BLISTER RUST INTENSIFICATION

General observations as well as the results of some pine inspection on the permanent blister rust plots revealed that 1941 was a very favorable year for the intensification of the rust. Thus, since the introduction of the rust in 1923 in the Inland Empire white pine belt, periods of heavy intensification developed in 1927, 1933, 1937 and 1941. If this intensification continues at regular four-year intervals, at least, then we may expect another heavy wave in 1945.

RATE OF INCREASE OF THE RUST

From an analysis of the rates of increase of the blister rust on forty plots well distributed over the Inland Empire white pine region the following tentative conclusions have been derived:

1. The rate at which the rust increases is the resultant of all the factors on a particular site which may have any influence upon the increase of the rust infection. For this reason it may be used as an index to the favorableness of the particular site for the development of the rust as well as a guide to the effectiveness of control in relation to the ribes population.

2. The rate of increase of the rust is the most satisfactory statistic which has been found for comparing the effectiveness of control on two or more areas.

3. A study of the curves obtained from the accumulative per cent of infection obtained for infection centers in the Inland Empire indicates that the white pine blister rust appears to act according to a biologic law which may be expressed by a mathematical curve. Comparing actual infection curves with that derived by means of the "logistic" and the third degree parabola revealed the fact that there was no significant difference between the curves for the actual infection and that calculated by means of the equations for either one of these curves. From a comparison of the standard errors of estimate the equation for the third degree parabola gave the closer approximation to the actual. Because of the much simpler calculations the equation for the logistic curve has been used in this study. For practical purposes Dr. S. B. Fracker prepared a semilogarithmic blister rust chart which reduces the curve to a straight line. If the accumulative per cent of infection is plotted on this chart, the rate of increase may be quickly determined and fairly accurate estimates made of the amount of rust present at the date of inspection.

4. In determining the accumulative per cent of infection from which the rate of increase can be determined it is necessary to determine the probable year each tree was first infected. It has been found that the easiest and most satisfactory way to do this is to use the age of the oldest wood bearing a canker as the year the tree was first infected. This will give an accumulative per cent within one year of the actual, that is, the apparent years of infection will be approximately one year earlier than the actual.

INFLUENCE OF THE NUMBER OF RIBES, FEET OF LIVE STEM, AND NUMBER OF TREES PER ACRE UPON THE RATE OF INCREASE OF THE RUST AND UPON THE PER CENT OF INFECTION AT ANY PARTICULAR TIME

Since the rate of increase of the rust in a particular area represents the composite result of all factors, a study was made of the relationship between this rate of increase and the measurable factors, that is, the number of ribes, feet of live stem and the number of trees per acre. From this

study it was found that these factors together accounted for 51 per cent of the rate of increase of the rust, that the number of ribes per acre was of chief importance; that the number of trees per acre had little influence, and that feet of live stem showed no direct correlation with the rate of increase of the rust.

Another study was made correlating the same factors with the per cent of infection resulting (1) from the initial introduction of the rust, (2) at the end of four years, and (3) at the end of eight years. The results of this analysis indicated that there was no positive influence attributable to feet of live stem, that the number of trees was most influential in the introductory phase of the rust but that their importance decreased rapidly the longer the rust was present, and that the importance of the number of ribes increased very rapidly the longer time the rust was present.

AMOUNT OF PROBABLE INFECTION WHICH VARIOUS NUMBERS OF RIBES MAY PRODUCE IN A GIVEN TIME

Since the rust is generally past the introductory phase in the western white pine type and since, as previously indicated, the number of ribes per acre is the chief factor that can be controlled and becomes more important the longer the rust is present, a study was made of the importance of various numbers of ribes upon the rapidity at which the rust increases. In this study the rates of increase for an eight-year period were computed on forty plots distributed over northern Idaho. By comparing this rate of increase with the number of ribes present on each plot an equation was derived from the logistic curve in which the number of ribes per acre and the time in years could be substituted in order to obtain the amount of infection probable at any particular time. Comparing the curves computed by means of this equation for the specific number of ribes on a plot with the actual curves produced by the accumulative per cent of the infection for the individual plots, as well as comparing the data mathematically as an eight-year time series indicated that there was no significant difference between the actual and computed values. By means of this equation the data in table 1 were derived. The relationship indicated by these data is clearly shown in graph 1. Since the basic data were only for the first eight years of the presence of the rust on the plots, only that period on the graph can be considered reliable. However, extensions indicated by the dotted lines beyond the eight-year period were computed as a suggestion of what the theoretical trend might be. Also, the data probably represent the maximum which may be expected since the basic data were for plots apparently very favorable for the development of the rust.

Although these results are only tentative, the information is reliable enough to serve as a guide for our judgment on the relationship between the number of ribes and the amount of infection which may develop in a given time under favorable conditions. The greatest departure from the actual will be found in the per cent of rust developed in the introductory phase because of the wide variation in the number of trees which may be present on a particular area.

These data and the curves portray the ability of the blister rust to seriously damage a young white pine stand in a short time and indicate how rapidly and thoroughly the ribes must be eradicated if white pine reproduction is to be protected. Furthermore, until the ribes are finally reduced in numbers to the point where the regenerative vigor of white pine replaces the losses caused by the fungus, the principal result of the progressive ribes suppression is to increase the time required for the rust to cause major losses in the pine stand. Prompt suppression of the ribes is especially needed after the rust has become established, giving promise of the most effective results if done during the first four or five years after the rust has become established in the stand.

Another point of interest is the small difference between the curves for one bush and that for ten bushes. A probable explanation for this small difference may be in the fact that all bushes are not equally effective in taking, developing and distributing the rust. Possibly only one bush out of five or even out of ten is so located that it is a serious menace and the results obtained in reducing small populations of ribes depend more on what bushes are removed rather than how many. This suggests further that unless the ribes population can be reduced below one bush per acre serious consideration should be given to the question of whether an attempt should be made to reduce the ribes population much below ten ribes per acre.

GRAPH 1

Relation Between Number of Ribes and the Amount of Infection in a Given Time

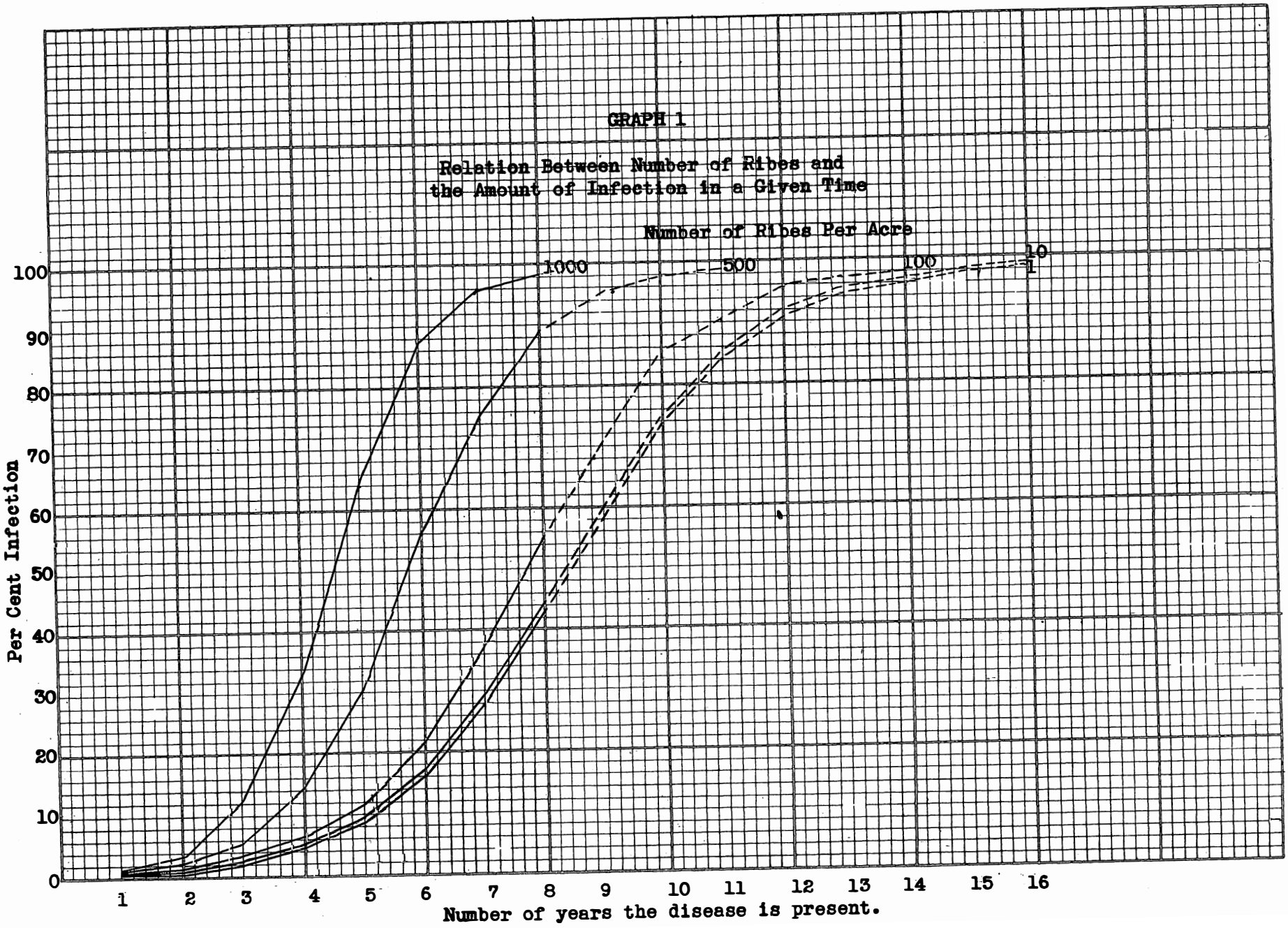


TABLE 1

PER CENT OF INFECTION PRODUCED BY A GIVEN NUMBER OF RIBES IN A GIVEN NUMBER OF YEARS

Number of Years	Number of Ribes Per Acre				
	1 Ribes	10 Ribes	100 Ribes	500 Ribes	1,000 Ribes
1	.73	.74	.76	.89	1.09
2	1.42	1.43	1.56	2.34	3.84
3	2.71	2.75	3.18	5.97	12.67
4	5.14	5.24	6.36	14.44	34.52
5	9.53	9.75	12.31	30.96	65.70
6	16.99	17.44	22.49	54.37	87.44
7	28.44	29.22	37.50	75.99	96.20
8	43.59	44.65	55.37	89.37	98.92
9	60.03	61.19	71.95	95.72	
10	74.48	75.50	84.14	98.34	
11	85.01	85.76	91.65	99.36	
12	91.68	92.17	95.78		
13	95.54	95.83	97.91		
14	97.65	97.83	98.98		
15	98.81	98.87			
16	99.37	99.42			

TIMING OF ERADICATION

The timing of the removal of the ribes will largely determine the success or failure of the effort to protect reproduction and young pole from the destructive effects of the blister rust. It should be assumed that any site is favorable for the optimum development of the rust until experience with the rust on that particular site has shown that the site is not favorable. Since the aecia are probably introduced at random, the initial per cent of infection is small and depends more upon the number of trees per acre than upon the number of ribes per acre. There is a small increase in the rust during the first three or four years. By that time the cankers started by the initial introduction are producing abundant aecia, so that closely associated ribes become heavily infected. Then there is an enormous increase in the rust and during this damage stage the rate at which a young reproduction stand may be destroyed depends upon the number of ribes. For this reason the eradication work should be timed so that the ribes are removed previous to this period of intensification. If all the ribes are not removed, then the effect of the eradication is to temporarily break the close association between ribes and fruiting cankers, but as soon as a few ribes become closely associated with fruiting cankers the condition is set up for another heavy intensification of the rust. If this intensification is allowed to take place, little effect of the first eradication may be evident upon the increase of the rust. In several cases where eradication had been carried out and not followed at the proper time by a second eradication very little change was noted in the rate of intensification of the rust when data were transformed into the type of curve shown in graph 1.

As mentioned previously, blister rust thus far in this region has shown heavy intensification at four-year intervals. If it continues to intensify at about this regular interval instead of intensifying gradually each year, then on the seventh year after the introduction of the rust the serious damaging wave occurs which it is imperative to prevent. Therefore, it is necessary to know the history of the rust on each area and from this information determine when, how many and how rapidly the eradication measures must be applied. If it is not feasible to execute the necessary program, then the area should be abandoned especially if it is one in which young reproduction predominates, and more especially in the case of planted areas.

DISTANCE OF SPREAD - AECIA

The spread of the aeciospores of the blister rust is of importance to the control program only in so far as it is the means by which ribes are reinfected each year. Thus far a distance of spread of over 300 miles has been reported. Also aecia have been caught in spore traps each 1,000 feet up to 5,000 feet over heavily infected areas. A recent study of the pinon rust, the aecia of which are very similar to those of the white pine blister rust, revealed evidence of spread of aecia as far as 625 miles from the probable source. A spread much farther and higher than indicated must be expected in view of the known distance of spread of many types of spores. Because of the great volume of aecia now produced in the white pine of this region it is probable that under favorable spring weather conditions a considerable volume of aeciospores are showered over the entire region so that attempts to reduce the production of aecia locally by means of pruning out cankers do not give much promise of justifiable results.

DISTANCE OF SPREAD - SPORIDIA

The spread of the sporidia from ribes is the most important type of spread of any of the spore stages of blister rust because the distance of this spread determines the width of protection zone which must be freed from ribes if protection is to be established. The determination of the spread from individual bushes will indicate the number of ribes which may be left in a white pine stand without jeopardizing the crop of white pine timber.

A review of the recorded experiences with blister rust in both the United States and Europe indicates that the protection zone is and should be varied according to local conditions. Spread of the sporidia has been reported to be from 50 feet to one and one-half miles or more depending upon many factors. Following are the more important factors which must be taken into consideration in estimating probable spread: variation in the spread from year to year, the stage of intensification of the rust, susceptibility of the ribes, concentration of ribes, size of bushes, screening of the ribes and pine, topography and location of the ribes with reference to the white pine to be protected.

In determining the importance of the various factors previously mentioned present available information appears to substantiate the following statements:

1. The rust thus far has shown definite indications of intensification at four-year intervals rather than a gradual increase. On account of this the distance and volume of spread will vary from year to year depending upon these years of heavy intensification.

2. The stage of the intensification of the rust on pines will be associated with a corresponding increase in the volume of rust on the ribes. This, in turn, determines the volume of spores available and, consequently, a greater distance of spread of damaging infection.

3. Although the ribes species is often given considerable weight in judging probable distance of spread, in the Idaho white pine region each of the species important in the control program is capable and does produce such a volume of rust that the species of ribes present should be given much less weight than is given to the other factors.

4. Just how important concentration of ribes is depends upon their location and the nature of their environment. Concentrations of ribes are not necessarily an indication of the volume of rust present. The same number of bushes, if scattered, has the possibility of having more rust than those in concentrations because of the possible close association of each bush with a fruiting canker.

5. The size of the ribes does not appear to be an index to the amount of rust present. Their importance depends upon their location and environment.

6. Screening is one of the most important factors to be considered in estimating probable long distance spread. If the ribes are in heavy brush or a dense growth of trees the spread from them will be relatively small. On the other hand, if the ribes are in the open or growing above the surrounding vegetation or in any condition so that the full force of the wind can strike them, a much longer distance of spread may be expected. Screening does not give much protection to the white pine. Dense tree growth or trees in brush are in a better situation for infection due to the maintenance of more favorable moisture and temperature conditions for infection for a longer period than is maintained in the open.

7. Topography is an important factor in determining the direction of spread of the rust. As the slope increases in steepness a greater amount of the rust originating from the bush will be on the lower side of the bush. For this reason, bushes located at the bottom of a slope will not have the possibilities for as great a distance of spread of the rust as those at the top of the slope.

8. If the factors previously given are favorable for spread then ribes located above a stand of white pine represent a more serious threat to the pine than ribes located below the stand.

One or more of these factors may have such influence in nearly every situation that the standard rule in use for years of using 200-300 yards is apparently obsolete as far as being followed in actual practice. In this

region circumstantial evidence has indicated under some conditions a spread of the sporidia of one to two miles. Although other factors complicate the situations in each case, yet in view of the findings in other regions these suggested possibilities are not exceptional for the particular type of situation. In the various situations which arise carefully planned surveys should be made, if the facts regarding the situation are not already available, in order to arrive at a decision concerning the desirable protection zone for that area.

In this region it has been possible to obtain data on spread from individual or clumps of bushes, but not on various widths of protection zones because of the early stages of the control program. One method of approach has been to study the distance from infected pine to the nearest ribes on plots with scattered ribes. This method gives the minimum distance which the sporidia must have traveled and produced infection. It will not give the maximum distance because the infection on a particular pine may not have originated from the nearest ribes. Following are summaries of these studies:

On the Crystal Creek Plot 11 on the St. Joe operation the locations of all pine on the plot were recorded so that it was possible to study spread by one-foot zones within 25 feet of the ribes. In this case from the ribes to the edge of the 25-foot zone there was a gradual decrease amounting to about one fourth in the per cent of trees infected. The number of cankers per tree and number per infected tree were approximately the same for all zones.

On the Newman Lake Plot on the Mt. Spokane operation, it was possible to study the distribution of the infected trees and cankers by 25-foot zones for a distance of 200 feet from any ribes. In this case 75 per cent of the infected trees and 85 per cent of the cankers were in the first 100 feet from any ribes while the remaining 25 per cent of the infected trees and 15 per cent of the cankers were in the outer 100 feet, that is, were 100 feet or more from any ribes. On the other hand, taking the center zone with a 25-foot radius as a unit area and comparing this with similar sized areas in the successive 25-foot zones from a ribes showed that 61 per cent of the infected trees and 73 per cent of the cankers were in the 25-foot zone immediately surrounding the ribes. The remainder of the infected trees and cankers gradually decreased from the 50-foot zone with 14.5 and 12.6 per cent respectively, practically as a straight line to the outside zone, 175-200 feet, this latter zone having 2-1/2 per cent of the infected trees and one per cent of the cankers. The number of cankers per infected tree decreased from 2.8 in the first zone to one after the 100-foot zone.

On the Kalispell Creek plot 25 on the Kaniksu operation - a 1933 planting - a similar study to that of Newman Lake with a 200-foot limit was made. The distribution in this case was the result of a single wave of infection in 1937. In this case 53.3 per cent of the infected trees and 55.8 per cent of the cankers were in the first hundred feet. On a 25-foot unit zone comparison 42.7 per cent of the infected trees and 48.1 per cent of the cankers were in a 25-foot zone immediately around the ribes. The second unit zone had 20.5 per cent of the infected trees and 18.5 per cent of the cankers, these percentages decreasing in a linear relation to 3.2 and 2.6 in the last zone. The cankers per infected tree decreased from 1.3 in the first zone to 1.1 in

the 100-foot zone, averaging one canker per infected tree after that zone. This distribution was somewhat different from that for Newman Lake due to the more uniform distribution of the trees and the fact that only one wave of infection was represented.

The Powder House plot in the Clearwater operation presented the best opportunity to study spread of sporidia because of the size of the plot - approximately 90 acres - and because only a few well-distributed ribes were present. In this case the rust was introduced in 1933, then the ribes were eradicated in 1934, leaving scattered bushes. The ribes were generally in the open with, in the majority of cases, few pine within ten to fifteen feet of the bushes. Another wave of infection took place from these scattered ribes in 1937. The study of spread is based on this 1937 wave. Evidence of spread for at least 450 feet was shown by these data. Only 9.1 per cent of the infected trees were in the first 25-foot zone, this percentage gradually decreasing to .6 per cent in the 425-450 foot zone. The relation was linear. The distribution of the cankers showed 22.3 per cent in the first zone and ten per cent in the second 25-foot zone. Beyond the second zone the line gradually decreased following closely that for the infected trees. Since a circular acre has a radius of approximately 117 feet, then the acre immediately surrounding a ribes on the Powder House plot had 45 per cent of the infected trees and 55 per cent of the cankers. In other words, on this plot approximately one half of the infection from a single ribes took place on the acre immediately surrounding the bush while the remainder was well distributed for at least 350 feet beyond, an area of approximately 13.6 acres. Comparing similar sized areas in each zone shows that 47 per cent of the infected trees and 70.2 per cent of the cankers are in the first 25-foot zone. The second zone has 16 per cent of the infected trees and 10.5 per cent of the cankers. There is a gradual linear decrease from the second zone to the 425-450 zone, the latter having 0.1 per cent of the infected trees and .04 per cent of the cankers. The number of cankers per infected tree decreased from 3.3 in the first zone to 1.4 in the second zone gradually decreasing to one canker per infected tree.

On Kalispell Creek plot 24 on the Kaniksu operation, the conditions were somewhat different from any of the other plots. This area, planted to white pine in 1933, is largely open with only occasional brushy spots. The ribes are so distributed that a spread as great as 325 feet was found, that is, it was 650 feet in any direction to the nearest ribes. All of the infection is the result of an initial introductory wave in 1937 and local intensification has not occurred, as indicated by the fact that only ten per cent of the infected pine are in the 25-foot zone around the ribes and 6.2 per cent are in the outer zone 300-325 feet from any ribes. The distribution of the cankers is similar, 11.3 per cent in the first zone and 5.4 per cent in the outer zone. This type of distribution would appear to be the result of random distribution and suggests that the ribes had very little effect upon the distribution of the disease. However, a comparison of similar sized areas at various distances from the ribes indicates the influence of the ribes. In this case in the 25-foot zone surrounding the ribes were located 41.5 per cent of the infected trees, and 17.1 per cent were located on a similar sized area in the second 25-foot zone. Beyond this zone there is a gradual linear decrease to 1.2 per cent in the 300-325 zone. In the case of the cankers

48.2 per cent were in the first zone, 16.7 in the second zone, the per cent gradually decreasing in a linear manner until there is only one per cent of the cankers in the last zone. This shows the definite influence of the local ribes upon the distribution of the rust.

Near the Hanna Road on the Kaniksu operation two plots were established, each with a single clump of ribes in its center. A young stand of white pine is present in each cache, fairly well distributed over the area. During this last season the pine were inspected for five chains in all directions around these ribes. On the one plot which has about fifty per cent shade due to an overstory, 98 infected pines were found. On the other plot which has much less shade, 48 infected trees were found. The infection extended to the very edge of the area inspected in each case so that it will be necessary to extend the plots still further in order to determine the limits of the infection as well as to determine whether any other ribes are present besides the ones under study. Infected pine were found 420 feet from the ribes. This was all 1941 spread. In both cases the infection extended largely in a strip running nearly east and west from the ribes. At the Hanna plot area the direction of the prevailing winds is along an east-west line.

Another group of data of value to this spread problem was obtained from a subplot on the Powder House area in the Clearwater operation. The study was made around Ribes viscosissimum bush No. 152, located on a dry northwest 10 per cent slope. The area was stocked with an average of 2,100 fifteen-year-old white pine per acre. There were no ribes on the slope above this bush and the nearest ribes down the slope were one 127 feet northwest and one 135 feet northeast. The inspection of these ribes in 1941 revealed no rust on the bush 135 feet away and 1.15 square inches of rust on the other, while bush No. 152 had 24.58 square inches of rust. Regarding two other bushes 3 and 3-1/4 chains away in 1941 one was not infected and the other had .24 square inches of infection. In view of these facts it appeared that very probably a large part of any infection which had developed in 1941 on the pine around bush No. 152 probably came from that particular bush.

Since this situation offered an opportunity to learn the probable infecting power of a single ribes, all pine within 90 feet of the bush were inspected. From the analysis of these data the following information was obtained:

1. Three waves of infection were present, 1933, 1937 and 1941. Very little infection appeared during years other than those just given.

2. A total of 1,266 trees were inspected. Fifty-six per cent of these were infected. Grouping the data into 10-foot zones from the bush, 100 per cent of the trees were infected in the first 10-foot zone, this percentage gradually decreasing to 43 per cent in the 80-90 foot zone.

3. The 709 infected trees were first infected as follows: 24 in 1933, 242 in 1937 and 443 in 1941.

4. Considering new and repeat infection the following number of trees were infected by each wave; 24 in 1933, 255 in 1937 and 640 in 1941.

5. The probable origin of the 6,050 cankers was as follows: 24 in 1933, 437 in 1937 and 5,589 in 1941.

6. Although the plot was on a gentle slope - about 10 per cent - yet there was a definite difference in the amount of infection and number of cankers on the upper and lower side of the bush beyond the ten-foot zone. For instance in the 10-20 foot zone, on the upper side 75.8 per cent of the trees were infected and there was an average of 8.9 cankers per tree while on the lower side 84.6 per cent of the trees were infected with an average of 44.4 cankers per tree. This difference was more evident in the 80-90 foot zone. Above the ribes 20.4 per cent of the trees were infected with an average of .2 cankers per tree. Below the bush in this zone 51 per cent of the trees were infected with an average of 1.1 cankers per tree.

7. Approximately 75-86 per cent of the infected trees will be killed by the infection which was found.

8. Blister rust distributed largely from this one bush will destroy this pine stand on the acre immediately surrounding the bush and will cause serious damage over a considerably greater area as indicated by the fact that 43 per cent of the trees are infected in the outer ten-foot zone. The data from the other plots indicate that serious infection from this ribes may extend out 300-400 feet from this bush.

INFLUENCE OF OVERSTORY UPON THE DEVELOPMENT OF THE RUST ON THE CLEARWATER OPERATION

Hollywood plot 9 on the Clearwater operation was established in 1938 on an area which had been logged in 1934. An overstory of white pine was left consisting of white pine 100-150 feet tall. Reproduction established itself in various degrees of stocking over the area, averaging approximately 5,000 white pine per acre, nearly free from other species of trees. The ribes were eradicated in 1933 before logging. When the plot was established, an average of 34 ribes per acre was found, irregularily distributed over the plot of 6.4 acres. In 1938 and 1939 most of the ribes were infected, a great many quite heavily. This was unusual since no fruiting cankers were found on the young white pine, consequently, it appeared probable that some fruiting cankers must be present in the overstory.

This supposition was verified in 1943 by the examination of some of the trees from the overstory which were blown over or had their tops broken out by heavy snow and ice. Thirteen trees were examined. Infection was found in six of the trees. In three cases the rust was either in the trunk or will surely reach the trunk. The infection was 40 to 100 feet from the ground in the corymb-like crowns of the trees. Some of the infection originated in 1927 and 1933 but most of the infection was of 1937 origin. Nearly all the cankers had produced aecia several times.

These facts indicate that, due to the fruiting cankers in the overstory, that is, those originating in 1927 and 1933, the ribes in the immediate vicinity were consistently more generally and heavily infected than they would have been from aecia which had traveled for some distance. Certainly, the

ribes would not have shown the annual heavy infection if the spores had been coming from remote cankers because of the influence of seasonal conditions on the effective long distance spread of the aecia. Under such conditions the rate of increase of the rust was speeded up about four years over that which would be expected. This means that on partially logged areas where the overstory might contain cankers in order to protect the white pine from the rust the ribes must be eradicated immediately and thoroughly approximately four years earlier than normally. Of course, if the area is uniformly stocked with 5,000 trees per acre the situation will not be so serious but since many parts of this area had much fewer pine per acre, the stocking will be greatly reduced in many places.

The further fact should be noted that there was some infection originating in 1937 in the overstory, very evidently from the ribes below and that some of this infection will be damaging. In this case 50 per cent of the trees will be damaged, but this is not necessarily a general damage possibility because the sample in this case was very small. Additional studies should be made by felling trees, if necessary, in order to obtain more information of this nature. Such inspections should be made in May or June during the period of aecial production, otherwise many cankers will be missed due to the obscuring of the symptoms in the older, slow-growing branches.

THE IMPORTANCE OF RIBES LACUSTRE IN THE CONTROL OF BLISTER RUST

A thorough study has been made of all of the information available regarding R. lacustre and its importance in the control of white pine blister rust in the Inland Empire. As a result of this study, the following conclusions seem to be justified:

1. R. lacustre is the most widely distributed and is found in a greater variety of ecological habitats than any other species of ribes.

2. The low susceptibility of R. lacustre has been indicated several times. This has been one of the reasons for considering this ribes of lesser importance compared to other species.

3. R. lacustre can be the agent not only for the establishment of the rust but may be the source of enough rust to cause rapid intensification in white pine and consequently cause serious damage to white pine.

4. Small bushes of R. lacustre represent a greater menace to white pine than their size indicates. The size of a bush is no indication of the amount of rust which it is apt to carry.

5. The volume of rust on a ribes is much more dependent upon the amount of shade and/or the nearness of a fruiting canker than upon the susceptibility of the ribes species to the rust.

6. Because of the growth habit and brittleness of the crown, especially in the late summer and fall, as well as the ease of layering, it appears to be one of the most difficult upland species to eradicate. This is confirmed

by the fact that in most areas with mixed populations of ribes, as successive eradications progress, there is a gradual increase in the proportion of R. lacustre to other species, many times terminating in an almost pure population of this species.

7. All the data indicate that R. lacustre produces enough rust to cause serious damage to white pine, consequently, it must be thoroughly and completely eradicated and an area should not be given deferred priority because of the fact that R. lacustre is the only ribes species present.

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1943

By
Frank O. Walters, Assistant Regional Leader
H. Miller Cowling, Scientific Aid

The year 1943 represented a considerable curtailment of the photographic and educational work, only the more essential elements of the work receiving attention.

In addition to the work of this region the photographic section provided services for the Sugar Pine Region and the Pear Psylla Control.

The various members of the technical staff participated in the educational phase of the work by showing motion pictures, giving lectures and providing information and literature to the various camps.

A. Photographic Section

The major objectives of this section are: (1) The maintenance of a pictorial record of control and investigative work, (2) the supplying of photographs, charts, maps and manuals for facilitating the field work, and (3) the production of material for educational purposes. The amount of work performed under items (1) and (2) was considerably reduced this year.

All the work during 1943 was reduced to a minimum. The Multilith machine and the black-line printer turned out the most material. The greatest volume was produced for the office of Pear Psylla Control.

Throughout the year the mimeograph machine was in use for the production of small temporary forms, bulletins, and the body of this report. Operation of this machine was handled chiefly by the stenographic personnel. No work was done for Pear Psylla Control on this machine.

The importance of series pictures (rephotographing the same areas yearly) has made this phase of the field photography a major field project. Two illustrations of series pictures are used in this year's annual report. Colored photography was continued on a restricted basis, being used only on series pictures.

The summary of reproduction work by photographic and machine methods for 1943 is given in the following table:

PHOTOGRAPHIC, MULTILITH, BLACK-LINE AND MIMEOGRAPH WORK

Item	North-western Region	Sugar Pine Region	Pear Psylla Control	Total
PHOTOGRAPHIC				
Lantern slides, natural color	84			84
Films, developed, field films	102		11	113
Copies, 5x7	42		51	93
8x10	51		11	62
Printing, 4x5 or smaller		202	120	322
5x7	344		60	404
8x10	12			12
9x11	200		520	720
Enlarging, 11x14 or smaller	6		4	10
16x20	10	14	21	45
20x24	44			44
on 5x7 film			13	13
Total Items	895	216	811	1,922
MULTILITH				
Copies	58	33	60	151
Plates made	91	79	49	219
Cards printed	2,500		93,500	96,000
Cards printed, reverse	1,000		93,500	94,500
Total cards	3,500		187,000	190,500
Paper printed	8,000	9,500	35,500	53,000
Paper printed, reverse	3,500	7,000	6,000	16,500
Total paper	11,500	16,500	41,500	69,500
Total Items	15,149	16,612	228,609	260,370
BLACK-LINE PRINTER				
Total maps, printed	529		1,728	2,257
MIMEOGRAPH				
Total paper	13,140			13,140
Grand Total All Items	29,713	16,828	231,148	277,689

B. Educational Section

Additional motion pictures were taken of the Priest River log drive in order to improve that portion of the logging sequence in the western blister rust film.

Good demonstrative and educational use is now being made of the several photographic series depicting progressive white pine regeneration, growth and development over a period of years. These series have attracted much interest and have been widely circulated.

A photographic album has been prepared to graphically illustrate the various phases of the work and methods used.

1. Bulletins and posters. Bulletins and literature dealing with blister rust were made available to all employees engaged on blister rust control during the past season. Posters were displayed in the various camps.

   All requests for printed information received at this office were filled.

2. Talks, slides and motion pictures. Particular effort was made to acquaint the temporary employees with the problems and techniques of the job through the medium of lectures, camp meetings and continual on-the-job education to stimulate their own interest and to enable them to impart intelligent information to those whom they contacted in their home communities.

   Due to war restrictions no fairs or exhibits are being held. Formerly slides and motion picture showings were made at these gatherings. As a consequence the scope of this type of educational work has been greatly reduced. Eleven showings of the western motion picture were made before 545 people.

   A reprint of a series of pictures of white pine regeneration made over the last ten years appeared in the November issue of the American Forests.

APPROPRIATIONS
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NORTHWESTERN REGION

Regular Appropriations

Fiscal Year 1943:

Project 3101.14 (Administrative)	$83,500.00	
Project 3103.14 (Cooperative)	75,195.00	
		$158,695.00

Fiscal Year 1944: (as of 12/31/43)

Project 3101.14 (Administrative)	$80,000.00	
Project 3103.14 (Cooperative)	56,088.00	
		$136,088.00

Contributed Funds: (deposited with U. S. Treasury)

State of Idaho	$10,000.00	
Clearwater Timber Protective Association	386.68	
		$10,386.68

TABLE 1

FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL CALENDAR YEAR 1943, REGULAR APPROPRIATIONS

	Project	Salaries	Expense	Total
	January 1 to June 30, 1943			
I	Planning, Coordination and Technical Direction			
	1.1 - Clearwater Operation, Idaho	$ 2,215.90	$ 147.63	$ 2,363.53
	1.2 - St. Joe Operation, Idaho	5,103.26	518.95	5,622.21
	1.3 - Coeur d'Alene Operation, Idaho	1,995.67	26.21	2,021.88
	1.4I - Kaniksu Operation, Idaho	3,748.02	141.88	3,889.90
	1.6C - Cabinet Operation, Montana	1,930.25	100.51	2,030.76
	1.7G - National Park, Glacier	185.29	28.83	214.12
	1.7R - National Park, Rainier	185.29	25.66	210.95
	1.X - Poison Oak Eradication	- 491.09	- 323.80	- 814.89*
	1.A - Office Maintenance	12,066.61	3,007.76	15,074.37
	1.B - Supervision	5,243.40	109.88	5,353.28
	1.C - Education and Information	2,924.21	107.62	3,031.83
	1.D - Control Investigations	4,879.27	65.57	4,944.84
	1.E - Methods Development		12.70	12.70
	Total, Project I, January 1 to June 30, 1943	$39,986.08	$ 3,969.20	$43,955.28
III	Cooperative Ribes Eradication on State and Private Lands			
	3.1 - Clearwater Operation, Idaho	15,652.40	4,574.16	20,226.56
	3.2 - St. Joe Operation, Idaho	13,164.70	3,559.22	16,723.92
	3.4I - Kaniksu Operation, Idaho	13,099.12	4,409.30	17,508.42
	Total, Project III, January 1 to June 30, 1943	$41,916.22	$12,542.68	$54,458.90
	July 1 to December 31, 1943			
I	1.1 - Clearwater Operation, Idaho	4,232.35	406.09	4,638.44
	1.2 - St. Joe Operation, Idaho	7,519.55	1,122.15	8,641.70
	1.3 - Coeur d'Alene Operation, Idaho	1,720.10	65.60	1,785.70
	1.4I - Kaniksu Operation, Idaho	493.07#	1,025.78	1,518.85
	1.6C - Cabinet Operation, Montana	319.02**	130.68	449.70
	1.7G - National Park, Glacier	172.01	27.94	199.95
	1.7R - National Park, Rainier	172.01	55.49	227.50
	1.A - Office Maintenance	11,428.32	2,440.50	13,868.82
	1.B - Supervision	5,028.24	365.38	5,393.62
	1.C - Education and Information	1,764.12	97.62	1,861.74
	1.D - Control Investigations	3,865.49	89.97	3,955.46
	1.E - Methods Development		12.12	12.12
	Total, Project I, July 1 to December 31, 1943	$36,714.28	$ 5,839.32	$42,553.60
III	3.1 - Clearwater Operation, Idaho	17,357.02	2,230.96	19,587.98
	3.2 - St. Joe Operation, Idaho	13,410.94	1,310.83	14,721.77
	3.4I - Kaniksu Operation, Idaho	12,248.75	1,251.59	13,500.34
	Total, Project III, July 1 to December 31, 1943	$43,016.71	$ 4,793.38	$47,810.09

* Salary and expenses of H. J. Hartman, 10/24/42-12/15/42, included in 1942 expenditure report, repaid by War Department during March, 1943.

** Net amount after crediting repayment of A. S. Skoglund's salary 7/1-11/30 by Forest Service - $1,595.10.

\# Net amount after crediting repayment of H. A. Brischle's and L. J. Easley's salaries 7/1-12/31 by Forest Service - $3,495.72.

TABLE 2

SUMMARY OF EXPENDITURES FROM STATE AND PRIVATE FUNDS, 1928 - 1943, IDAHO

Year	State	Private	Total
1928	$ 2,518.55	$ 2,264.32	$ 4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
1941	7,542.73	15,756.40	23,299.13
1942	22,761.68	15,440.78	38,202.46
1943	12,252.13	386.68	12,638.81
Total	$174,705.04	$119,967.49	$294,672.53